



A
COLLECTION OF ENGRAVINGS,
REPRESENTING
THE MOST MODERN AND APPROVED
INSTRUMENTS
USED IN
THE PRACTICE OF SURGERY.

WITH
APPROPRIATE EXPLANATIONS

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THE LETTER-PRESS BY T. BENSLEY.

1798.

COLLECTION OF ENGRAVINGS

TESTIMONY

THE PRACICE OF SURGERY.



A. H. SAVIGNY

P R E F A C E.

THE offer to public notice of a Work extensive as the following from so inconsiderable a pen, betrays an appearance of presumption or vanity that necessarily demands some explanation, by which the imputation may, at least, be diminished, if not entirely removed. I must confess that, on the first suggestion of the undertaking, my mind, impressed with apprehensions of its insufficiency, shrunk from the attempt, and, my fears almost confirming my doubts, had well nigh induced me to resign the intention. The reflections, however, that the subject was so immediately connected with my constant pursuits as to convey the most disgraceful reproach if I was not possessed of some knowledge respecting it, and that in its prosecution the mere plainness of mechanic description, unassisted by profound erudition, or the embellishments of splendid language, would only be required; and further, the flattering approbation of my design, expressed by many of the first characters in the profession, imparted encouragement too resistless, and finally determined me to hazard the event, and to submit the result of my endeavours to the public tribunal; convinced that, in its estimation, their well meant tendency to utility will be accepted for more finished execution, and admitted to claim its favour and protection.

In the course of near twenty years engagement in the business of an Instrument-maker, I have frequently had cause to lament (as a workman) that we were not better furnished with engravings, and suitable explanations, of the numerous articles which constitute indispensable appendages to a branch of science peculiarly dignified by its importance to mankind, by the superior talents of its professors, and, the result of their assiduous and unwearied researches, by its rapid and astonishing improvements; and I have still more deeply regretted that

such a deficiency should exist in this country (justly famed for the cultivation and encouragement of every description of useful arts) when in two others, works have been published in which the accomplishment of what I now aim at has been very nearly attained; I mean those of Brambilla at Vienna, and of Peret at Paris. I say *very nearly* attained; I wish not by this apparently invidious expression to be understood as in the least intending to depreciate the merit, or lessen the utility, of these performances; on the contrary, it is my desire to allow them all possible praise, as being hitherto the most useful of their kind, and to render the tribute which I myself owe to them for the essential information and assistance they have in many instances afforded me; but this I must add, that the engravings in the former are so ill executed as nearly to defeat their design, while the latter (whose plates are finished in a style altogether as masterly) has admitted so many tedious minutiae (even to representations and descriptions of the meanest tools used in the fabrication of instruments) both in the designs and letter-press, that, though the volume is by these means swelled to an enormous size, much useful and necessary information is suppressed by the introduction of trifling and superfluous matter. It will here possibly be urged, that we have already numerous publications representing instruments of every description. I admit that we have many, and while I do so will venture the assertion, that if we had fewer (far as relates to the information which these representations convey to mechanical execution) it would be better, for the workman would then have the advantage of verbal or literal instructions immediately communicated by the operator, whose ingenuity and precision would most effectually direct his judgment in the construction of the instrument desired, instead of his being (as is now too commonly the case) solely

referred to a particular figure in some particular plate, whose size and proportions he there finds so totally different from what its actual use requires, and whose explanation in the work itself is in general so insufficient (often none at all), that the chance of his being misled is infinitely greater than *that* of his gaining the necessary intelligence for the execution of the work to his employer's satisfaction; and this inconvenience, I will add, (with very few exceptions in particular and specific instruments) attends all our works of this description, from the earliest authors to the most modern productions; they are embellished with a profusion of Plates, but, more or less, fall under the same general character of deficiency of information. The designs give merely the figures of the instruments; but are, for the most part, unattended by that amplitude of detail of size, nature, and property, by which the workman might be assisted in his execution, or prevented from falling into error and misconception.

Thus feeling the necessity, I next considered whether I might not convert my private wishes to public advantage, and, by compiling a series of well executed engravings (explained to the best of my abilities) while I rendered myself and fellow workmen essential assistance in the executive prosecution of our callings, might not furnish at the same time no inconsiderable or unimportant addition to the professional libraries, especially to those of gentlemen whose residence may be very distant from the metropolis, and who, in this publication, may have constantly at hand the opportunity of referring with certainty to whatever instrument any particular case may require; while the improved expedition of our public vehicles will, in general, accommodate them in time for the most critical emergency.

It is not my design in the following Work to enter into a comparative history of old and new instruments, or to crowd it with representations of those that are obsolete and out of date; but to confine myself to those of the most modern and approved constructions, and

such as are actually in use in our principal hospitals, and highest in the estimation of our most distinguished practitioners; nor shall I presume in my explanations to dictate the mode of using any particular instrument, or to say more of those invented or improved by any particular gentleman, than merely to point them out as such by the name of the inventor (descriptions of such being constantly to be met with more copious and intelligible in their own lectures and other publications, than would be either possible or proper for me to attempt); but while I thus limit myself in this particular, I shall think it equally my duty to be more diffuse when treating of such as I may have invented or altered myself, and to give some account of the motives by which I felt myself induced to adopt such invention or alteration; and here I shall probably find it necessary to enter into partial comparisons, and to describe the defects of an *old* instrument, by way of illustrating what I had conceived to be an improvement upon its construction in the *new*.

The instruments represented in the following engravings will in general be found of the exact size and proportion requisite for their use, and where (as in some of the larger machines) the limited dimensions of the plate would not admit of this, I have reduced them upon an exact though smaller scale. In the general arrangement also I have endeavoured to class them with every possible attention to distinctness and propriety, beginning with such as are usually comprised in sets, and concluding with those which, from their less connected purposes, may be termed miscellaneous, preserving at the same time amongst these, as closely as possible, the regularity and order in which they may relate to each other.

I hope it will not be deemed improperly digressive if I avail myself of this favourable opportunity of noticing a complaint sometimes made of the high price of surgeons' instruments. I must confess I feel considerable difficulty in treating of this, as it regards myself, from the

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peculiar good fortune I enjoy in being employed by gentlemen whose liberality is commensurate with their eminence; but it *does sometimes* occur, and I trust very little argument will be necessary to remove it entirely. It will be readily admitted that there is no species of manufacture whatever that requires such minute attention in its progress, such precise perfection in its completion, and that on these are dependent in *all cases* the proportion of pain they necessarily inflict, and in *many* even life itself. Hence I am persuaded, that there will not be found one considerate mind that will not reward it accordingly, especially when it is accompanied by the reflection, that the operator's sensibility in the use of a good or a bad instrument, must, in a great degree, be affected by the consequent increase or diminution of his patient's sufferings; and, independent of these natural effects upon his mental feelings (by which his manual expertness will ever be materially influenced), I may venture to add, that his reputation is essentially concerned, and that the trifling difference of expense between a well finished and high conditioned instrument, and its inferior, will never fail of being amply repaid, both in profit and in fame. As I have said above, I have entered upon this part of my subject with much hesitation and reluctance, but trust that I shall be pardoned for what I have advanced, when I declare my sole motive to have arisen from the hope of removing from myself, and brethren of the trade, the odium of ex-

orbitancy, where a fair and liberal compensation for exquisite workmanship is only expected: in short, these articles do not (at least should not) admit of mediocrity; and, to produce their indispensable perfection, artists of no common talents must be employed, whose pay must ever be proportioned to their attention and abilities.

I should hold myself unpardonable if I concluded without attempting to express my very grateful sense of the friendly aids I have experienced upon *many*, but particularly on *this* occasion, from some of the leading characters of the profession; their collections have been at my command, their information and opinions sincere and unreserved, and their kind communications, while they have materially assisted my present undertaking, have left a lasting and indelible impression upon my mind.

That numerous imperfections will appear in the following pages, my fears too forcibly premise; the only apology for them which I can offer, or can hope will be accepted, is, that it is a mechanic, not a scholar, who writes; and, thus depending upon the candour of an indulgent public, I submit them with less anxiety to its decision. If I have been fortunately enabled to cast a mite into the universal treasury of useful knowledge, my most ardent wishes have been completed, my utmost ambition amply gratified.

PLATE I.

AMPUTATING.

THE INSTRUMENTS for AMPUTATIONS having ever stood foremost in the class of those termed capital, I have preserved the same order here, and have selected them for the leading subjects of this undertaking.

FIG. 1. The Saw now in universal use, distinguished by the superior neatness of its construction, and facility of its management, from *that* formerly made with a frame or bow, and by its appellation of Pott's, from the preference constantly bestowed upon it by that very celebrated operator. As this is an instrument in which perfection of make, and propriety of application, are essentially requisite, I shall suggest some few instructions respecting its formation and subsequent use. The workman must be particularly attentive first to the quality and temper of his steel, which should be just so hard as not entirely to resist the impression of the file; the edge, furnished with teeth, should be somewhat thicker than, and gradually declining in substance, to *that* to which the back is adjusted; the surfaces of the blade should be perfectly regular and smooth, and the teeth uniform and of equal size. In respect to this it is, perhaps, impossible to fix a precise standard, but I have ever found that about twelve to an inch have answered the purpose most completely; if they are finer, though they may afford a smoother surface of bone, and occasion fewer splinters, they become so clogged during the operation, as to render it unnecessarily tedious; and if coarser, they will act too rudely, produce too violent an agitation of the limb, and splinter the edges of the bone to a degree that may afterwards become troublesome, if not dangerous. The blade and teeth thus formed, it remains only to finish, or, as it is termed, to set the latter: this must be done with the utmost precision, taking care that every tooth has its perfect point; and, if very slightly, but very regularly bent outwards in alternate opposite directions, their progress through the bone will be materially assisted. Having said this much respecting the forming and finishing of this instrument, I hope to succeed in the attempt to rescue it in future from the complaints too often made of its insufficient performance, by pointing out the error in its application from whence they originate; in almost every instance, this arises solely from the sparing or diffident manner in which it is employed, more than two or three inches of its length (and with very slow motion) being brought into action; whereas a slight consideration of the mechanical properties of the teeth will convince that their best effects must arise from their rapid and continued succession, consequently that by a brisker and more extended application the saw will perform its office with more expedition and success.

Since this engraving was finished a handle to this instrument of a more commodious construction has been adopted, a representation of which will be found in the Thirty-sixth Plate.

FIG. 2. The small, or, as it is commonly termed, the Metacarpal Saw, for removing splinters of bones, and dividing those of the fingers, or toes, in the amputation of these members; for which purpose its frame is made semicircular, as in operating upon *one* it is sometimes found convenient that the others should be encompassed within the space between the frame and back of the blade.

FIG. 3. A Knife of the most approved form, and of a size sufficiently large for any purpose. Care should be taken in the construction of this instrument, that the back is not thicker than absolutely necessary to give and support the required firmness of the edge, otherwise it becomes unwieldy in its management, and, acting as a wedge in passing through the flesh, creates a resistance to the edge which must materially impede that cleanness and delicacy of cutting so essential in this operation.

FIG. 4. A second Knife, of a smaller size, for purposes where the other might be inconveniently large. To avoid useless repetitions, I have delineated *this* with a double edge for performing the operation in the mode described by the ingenious Mr. Allanson of Liverpool.

FIG. 5. The Catlin of the most proper size and construction for making the interosseous division in amputations of the legs.

FIG. 6. A pair of Forceps, formerly, and indeed till very lately, inserted in this set, for retaining the artery till secured by ligature, but more properly adapted for the extraction of polypi.

FIG. 7. A pair of Forceps, of more recent and more convenient form, for the same purpose; the sliding button, with which it is furnished, by fixing its points in any given degree of contact, secures the artery when engaged between them from the possibility of escaping, and contributes essentially to the facility of its subsequent management.

FIG. 8. The Tenaculum for taking up arteries in *this* and many other operations.

FIG. 9. A pair of Cutting Nippers of the most proper form for removing small fragments of bones in situations where the metacarpal saw cannot be conveniently applied.

PLATE I.

Fig 1.



Fig 2.

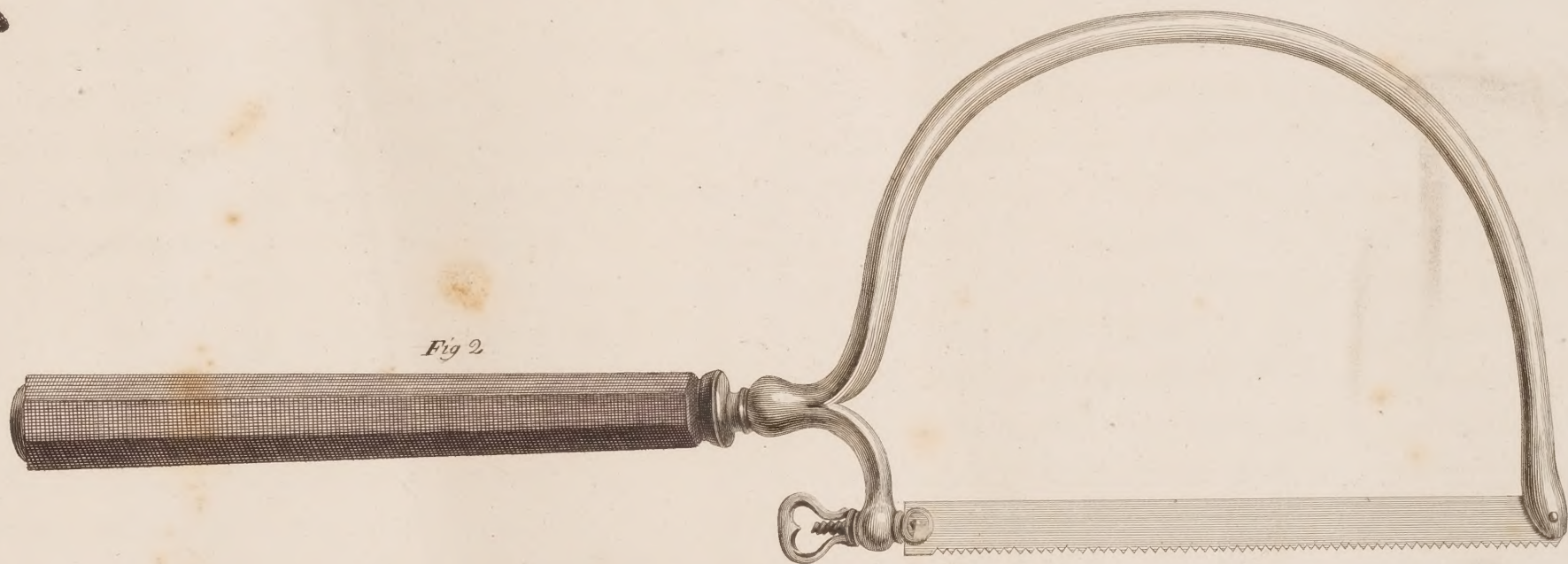


Fig 5.

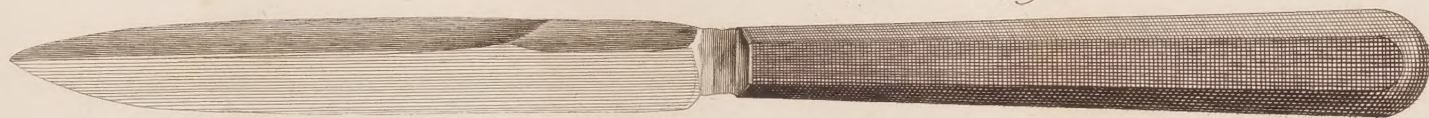


Fig 4.

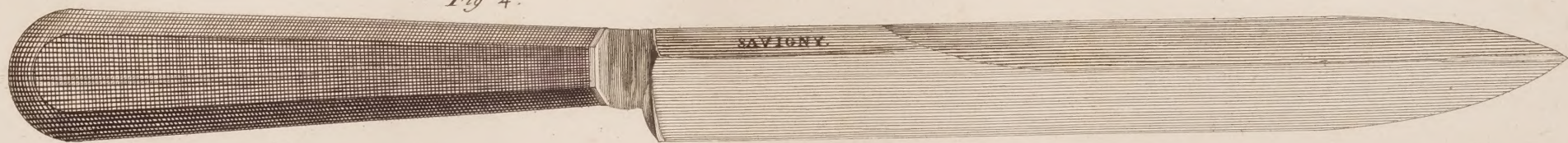


Fig 3.

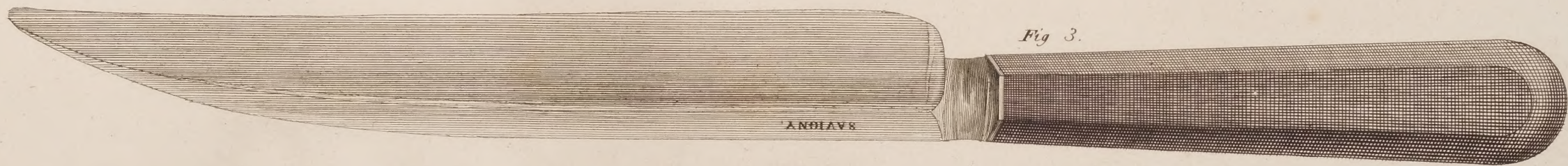


Fig 6.

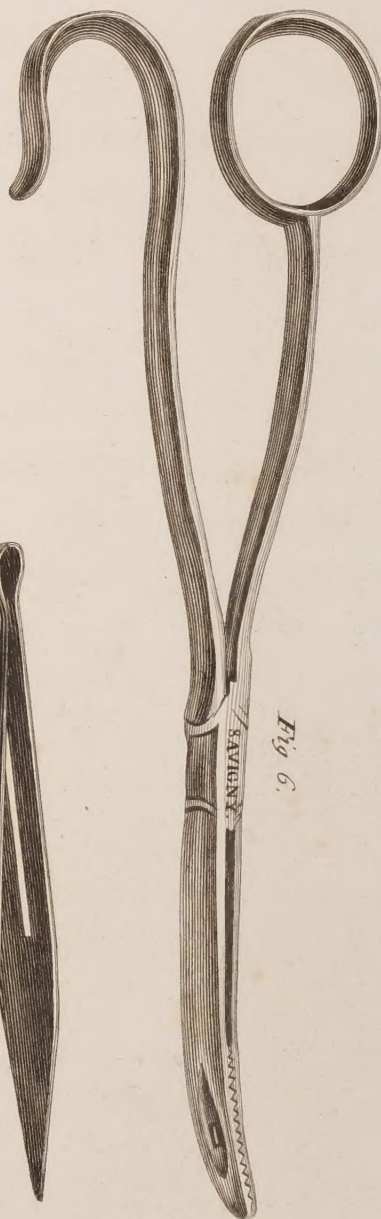


Fig 7.



Fig 9.

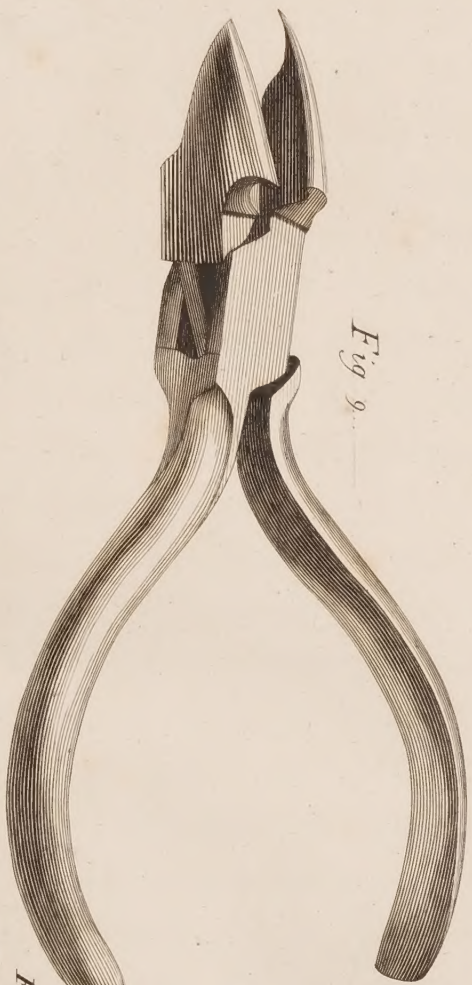


Fig 8.



PLATE II.

TOURNIQUETS

FOR compressing the principal artery in amputations, and for suppressing violent hæmorrhages proceeding from accidental wounds.

FIG. 1. The old original instrument, consisting merely of a broad piece of strong leather (a), with a transverse opening near each extremity; a handle (b), a cushion or compressor (c), to be applied upon the artery, and a bandage formed of what is called webbing, or strong tape, whose stricture is increased by twisting the handle passed through it when tied round the limb. The material objection to this instrument arises from the necessity of its being constantly retained in its situation by the hand of an assistant.

FIG. 2. The instrument originally invented by Petit, and since improved by Freake, in which the inconvenience of *that* described above is completely remedied by the action and security of the screw. This instrument is made of brass, is of such established merit, and so universally known, that the mere representation of its figure precludes the necessity of further explanation; (a) a compress to be applied upon the artery.

FIG. 3. Rymer's Tourniquet, so called from its being the invention of a gentleman of that name, when in the service of the navy, and principally intended to stop the violent hæmorrhages that frequently occur during action, when the confusion of the scene will not afford time for more permanent relief. This contrivance has great merit; the only objections to it are the slowness of its motion, and the complication of its construction: as, however, I wish to do it every possible justice, I have given it a particular and accurate description. It is made of brass, and of the exact size and substance here delineated: (a) a dented wheel attached to the roller, receiving motion from the endless screw (b); (c) the roller to which the bandage is attached, by passing through an opening in its centre, and by whose motion, communicated as above, being wound round it, its stricture upon the limb is increased; (dd) two plates of brass forming the frame of the instrument, connected together by a strong bottom, all cast in one piece; (e) one of two small rollers (that on the other side not being visible) between which and the bottom of the frame the bandage passes; these, acting as pulleys, add considerable power to the action of the instrument; (f. g.) two strong cheeks fixed to the inside of the frame (d), next the dented wheel, to receive the two ends of the endless screw (b); (h) a piece of leather sewed upon the bandage under the buckle to prevent it from lacerating the limb as the stricture becomes more increased.

FIG. 4. A front view of one side of the frame of the same instrument, exhibiting the centre, on which the main roller turns; (a) the frame itself; (bb) two screws which fix the cheek (g), Fig. 3. (f) being cast solid with the frame; (c) a milled head female screw, which secures the winch (d) on its place when the instrument is used, and permits its

removal when its end is attained: this circumstance constitutes the chief merit of the contrivance; as from the properties of the endless screw, when the winch which gives it action is displaced, it is beyond the power of accident to move it, and consequently to create any alteration in the stricture of the bandage; and thus the patient may be left with perfect safety, till time can be allowed to attend more particularly to his situation.

FIG. 5. An instrument invented by myself, which, from the nature of the service it is more particularly directed to, is distinguished by the appellation of *Field Tourniquet*; as in the combination of lightness, simplicity, effect, and moderation of price, it is rendered a desirable acquisition to our army and navy, in both of which it has been extensively employed. In this figure I have represented it mounted, to shew the principles of its action, and the means by which the bandage is tightened and secured. (a) a small spiral spring fixed to the handle at one of its extremities, and connected at the other to the catch, which it keeps constantly down upon a circular ratch on the top of a flat piece of brass, to be applied immediately upon the limb, and thus retains the bandage in any desired degree of stricture; in short, the general principle of this instrument is precisely the same with that of Fig. 1, with this essential advantage, that it does not require the constant attention of an assistant's hand to secure the object it has attained; (b) a compress of cork covered with leather under the buckle, to be applied immediately upon the artery.

FIG. 6. The same instrument divested of its bandage to shew more distinctly its component parts; (a) a flat piece of brass with four transverse openings for the passage of the bandage: it is slightly concave on its inferior surface to accommodate it more readily to the convexity of the limb, and on its superior it is furnished with a circular ratch, or row of inclined teeth (b); cast in one solid mass, receiving the end of the catch (c), which, as the handle moves round, impelled by the small spiral spring (a), Fig. 5, keeps falling in them, and prevents the return of the handle, and the consequent loosening of the bandage, when it has been strained sufficiently for the necessary purpose; (d) a small pin which attaches the upper end of the catch (c) to the handle; (e) the pillar of the instrument, strongly connected by a square to the centre of the handle at one of its extremities, and by a moveable rivet to the brass plate at the other. It was at first slightly objected to this instrument, that it was attended with some difficulty to loosen the bandage occasionally; a more familiar acquaintance with its principles, which permit the catch to be easily lifted up by the finger, and conducted at discretion from one tooth to another, and an alteration in the teeth themselves, by leaving them considerably lower than when first invented, have since entirely removed it.

PLATE II.

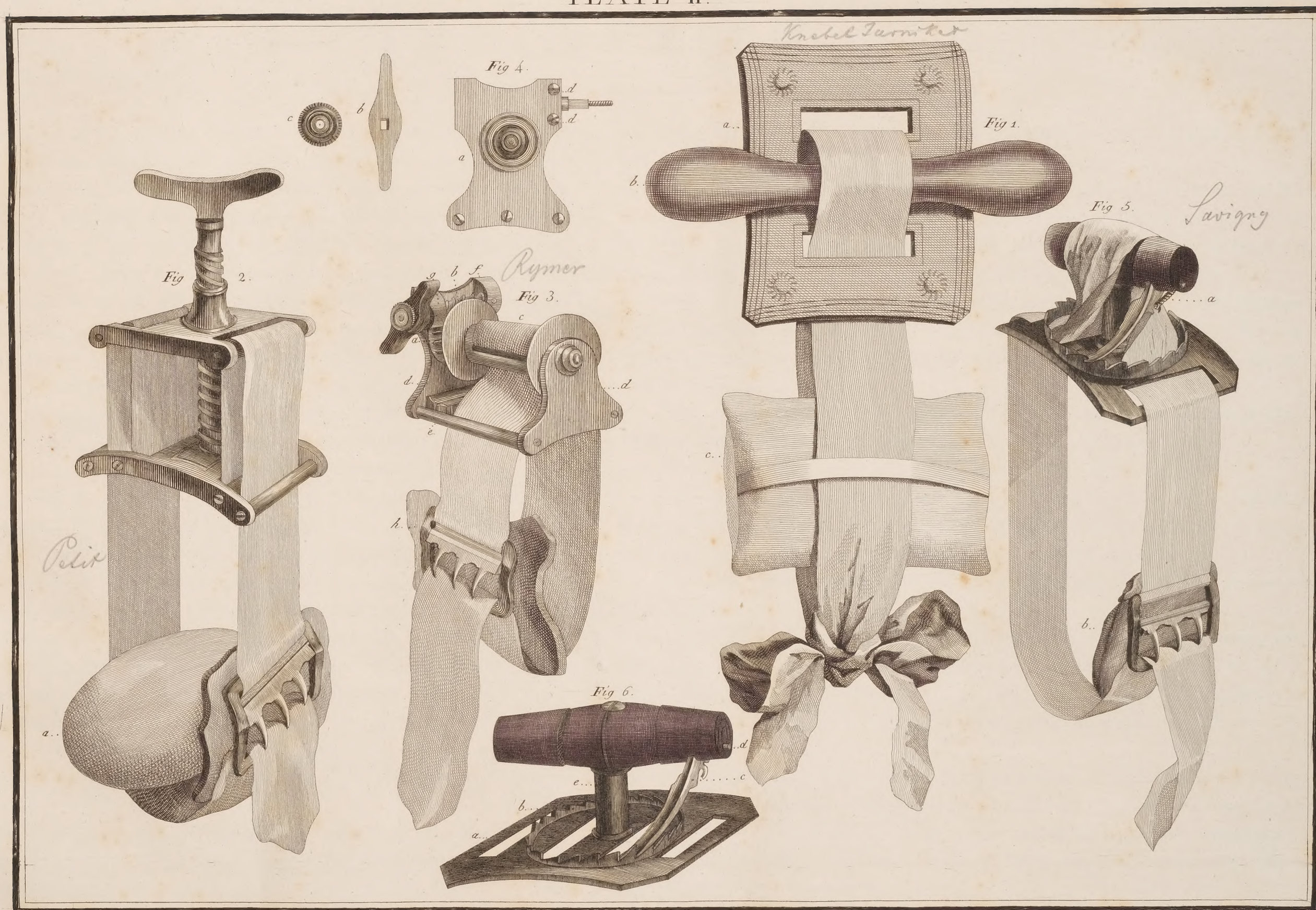


PLATE III.

TREPANNING.

FIG. 1. the instrument for removing portions of bone in injuries of the cranium, known by the name of Trepine, from the triangular form it acquires by the horizontal position of its handle, and in contradistinction to the Trepan, in which the head or crown was affixed to a frame or brace, similar to, and used in the same manner, as the carpenter's or cooper's wimble, now wholly laid aside, at least in this country. It is here represented in its latest and most approved construction, differing from all former ones, by being divested of the lateral teeth (as shewn in Fig. 2), which, instead of assisting, have ever been found to render the operation more laborious and tedious; while this, from its circle being constructed exactly upon the same principles as the amputating saw, performs its office with more celerity and neatness, and with infinitely less exertion of the operator; it is also attended with another important advantage, from the peculiar formation of the teeth, which being exactly perpendicular, act equally backward as forward, so that the hand in its retrograde motion, loses nothing in point of time or effect, as in the instrument, Fig. 2, it necessarily must; (a) a spring plate of steel covering a groove cut quite through one side of the stem or shank of the instrument, through this plate passes a flat headed screw, attaching itself to the inferior extremity of the centre pin, which it directs and fixes in any desired position, at a proper degree of projection beyond the extremities of the teeth in the circle at the commencement of the operation, and withdraws it entirely when they have formed themselves a sufficient channel to act in; (b) the point of the centre pin at its most extreme projection; (c) the centre pin itself detached from the trephine, its point so formed as to preclude the necessity of a previous perforator; thus by the superior construction of this instrument, the set is disencumbered of two appendages (the perforator and key) indispensably connected with Fig. 2.

FIG. 2. A Trepine of the old construction, introduced for the purpose of the foregoing comparison.

FIG. 3. A smaller Trepine to represent the different diameters of which these instruments are usually made, and also another mode of forming the lateral teeth.

FIG. 4. The perforator alluded to above.

FIG. 5. The Key to remove the centre pin of Fig. 2, screwed into the base of the crown; (a) a square hole adapted to the form of the pin.

FIG. 6. A pair of Forceps for extracting the circular piece of bone after it has been

cut through with the crown, and also small fragments frequently occurring in accidents of this nature.

FIG. 7. A pair of Spring Forceps for the same purpose, of a more recent construction. In using this instrument the fingers are necessarily disposed in a nearer contact with the object, and it is in consequence esteemed more convenient; (a) the largest extremity for the first of the above-named intentions; (b) the smaller one for the latter.

FIG. 8. The instrument termed a Lenticular, to remove the jagged particles of bone from the interior edge of the circle formed by the saw; (a) the inferior extremity of the blade adapted to the shallow cup (b), intended to receive what is scraped off, and to prevent its falling upon the brain.

FIG. 9. The Raspatory, an instrument used for similar purposes with the above in different situations, and on many occasions to excite exfoliation.

FIG. 10. A front view of the head of the same instrument.

FIG. 11. The Scalpel used in this operation. The steel part of this instrument is continued quite through the handle, and projects rather beyond it, forming a scraper to remove the pericranium, previous to the application of the trephine.

FIG. 12. An elevator with circular grooves to lengthen or shorten it as a lever when applied upon

FIG. 13. A triangular rest; (a) a pivot with a semicircular head to receive the elevator Fig. 12. This instrument is now almost universally laid aside, its use being attended with some degree of danger, from the circumstance that it creates a depression with the feet of the rest, proportioned to the power of elevation with the point of the lever.

FIG. 14. An instrument for the same purpose, of a more simple and useful construction, as the operator can manage it with more facility, and by rendering a finger of his left hand the fulcrum, avoid the danger apprehended in the former instrument.

FIG. 15. A brush usually inserted in the set to cleanse the teeth of the crown, should they become clogged during the operation.

FIG. 16. The double or head saw, furnished with a convex and a straight edge; a very useful instrument where the nature of the accident may not admit of the application of the circular saw.



P L A T E I V .

L I T H O T O M Y .

FIG. 1. The Cutting Gorget, distinguished by the appellation of Hawkins's (the name of its celebrated inventor), in its latest improved form; its concavity considerably diminished, its right or cutting side broader than the other, and somewhat flattened, by which the edge is rendered more perfect, and its incision more lateral; (a) its beak or point, which enters the groove of the staff. From the complaints I had been accustomed to hear of the difficulty of keeping this point in the groove of the staff in its passage into the bladder, and of the danger attending its flipping out, I conceived an alteration in the construction of this part of the instrument, which experience has proved to be essentially useful, and to have removed the inconvenience complained of: instead of leaving it, as hitherto, fullest at the extremity, I reserved the broadest, or rather highest part, for the centre, forming a sort of elliptic arch, by which it readily meets the curve of the staff in its progress, and spares the operator the necessity of lowering his hand to preserve the situation of the point; a circumstance indispensable in the old instrument, and attended with the evident disadvantage of varying the line of action of the edge; by which, instead of its forming a delicate and clear incision into the bladder, can only, by puckering it up as it were, make its way by added force, and at the expence of considerable laceration. This comparison is more fully illustrated by Fig. 1 and 2, in the Sixth Plate. The handle of this instrument (as they are now all made) is represented covered with wood, by which the hand acquires a degree of firmness in its hold, very conducive to the success of the operation, and more easily resists the effects of the unavoidable moisture. This instrument is of the usual largest size.

FIG. 2. A second view of the same instrument of the *smallest* size, representing the angle of the handle, and the extent of the cutting edge, which need never exceed from the

beak, where it should accurately commence, to (a), the same proportion attending the larger ones.

FIG. 3. The Cutting Gorget of Mr. Cline, an instrument in universal estimation: (a) the beak (of the same form as Fig. 1.); (b) the cutting edge, which is perfectly straight, and forms an angle with the point of the beak. The superiority of this instrument consists in the mechanical construction of the edge, evidently calculated to perform its office with peculiar ease and neatness.

FIG. 4. The same instrument, of the middle size, intended also to shew the angle of the handle.

FIG. 5. The Blunt Gorget, as it is now made, without a beak or point.

FIG. 6. Mr. Cruikshank's Cutting Gorget, (a. b.) the extent and form of its edge. The beak of this instrument is of the same construction as the former ones, and the angle of its handle precisely as that of Fig. 4.

FIG. 7. The most approved Lithotome, or Scalpel, to make the first incision.

FIG. 8. A pair of curved Forceps, of great utility in some contingencies of this operation.

FIG. 9, 10, 11. Straight Forceps, of the different and exact sizes now in use. These instruments are represented open, to shew the extent of the teeth in the excavated part of their blades, which ought never to exceed an inch towards the joint, as, otherwise, the stone, by being engaged nearer to the axis, would occasion so great an extension of the points as might produce in its extraction dangerous laceration of the external opening; the joints too, as here represented, should in none of their parts shut quite close.

FIG. 12. The Scalpel for this operation invented and used by the late Mr. John Hunter.



PLATE V.

LITHOTOMY

CONTINUED.

FIG. 1, 2, 3, 4. Male Staffs furnished with grooves at their curved extremities for the purpose of receiving the beak of the Gorget, and conducting it into the bladder; these are represented of the different lengths and diameters necessary for the age and size of different subjects, and of nearly the proper curvature; but as this may require occasional variation, the instrument should be made of steel, *not hardened*, to enable the operator to adjust this particular to his own satisfaction, and the necessity of the case. The utmost attention must be paid in the construction of this instrument, that the edges on each side the groove are perfectly rounded and smooth, otherwise the consequences on turning it as it enters the bladder will be extremely painful and injurious; the extremity of the groove too should not be closed, but should diminish gradually in depth as it approaches to the point, that the beak of the Gorget may slide off it with perfect facility. The handles are cut with teeth like a file, to give a firmness to their retention when in the bladder; which the fluid with which they become unavoidably lubricated, would otherwise render very precarious. I have not represented figures of the sounds for searching for the stone, as, excepting the grooves, they are described exactly above.

FIG. 5. A Female Staff, made under the same description as the male, excepting that it is shorter, straight, and of somewhat larger diameter.

FIG. 6. A short Sound, slightly curved, for searching the female bladder.

FIG. 7. An instrument furnished with a scoop (of different sizes) at each end, for extracting any fabulous matter that may remain after the stone is removed.

FIG. 8. An instrument termed a Hamula, particularly useful for extracting small portions of the stone that may have been broke by, or escaped the forceps, of which it resembles one blade: (a) a side view of the same instrument to shew its curve; it is furnished with teeth like the forceps, and when introduced in contact with the fore finger of the left hand, will readily engage with, and remove the smallest fragment.

FIG. 9, 10, 11. Silver Catheters, for the male urethra, of the different sizes usually required; they are each furnished with a fillet of wire to remove any obstruction in the canula from grumous blood, &c. In Fig. 9 *this* is partly drawn out to represent the stop which closes up the superior extremity of the instrument, and prevents the discharge of the urine till the operator is perfectly prepared for it.

FIG. 12. A similar instrument for females; it is represented double, that is, with a smaller one adjusted to its internal diameter, agreeable to a late ingenious improvement

of Doctor Clarke; so that the advantages of *two* very useful instruments are comprised in the compass of *one*; (a) shews the external, and (b) the internal one, in which the fillet is inserted.

FIG. 13. The same instrument, of a flattened form, suggested by Doctor Denman, and found more useful than the former in many cases occurring during pregnancy.

FIG. 14. The same instrument, constructed for the convenience of portability, its upper part (a), sliding into the inferior extremity (b), for about two inches, renders it when extended, long enough for use, and when shut up, sufficiently short to be conveniently carried in the smallest pocket case.

FIG. 15. A Male Catheter curved agreeably to the directions of Mr. Ware, in a treatise lately published by that gentleman, in which the mode of introducing this instrument is most scientifically described, and the advantages of this curvature as ably demonstrated.

While on the subject of Catheters, I must pay the merited attention to *those* formed of elastic gum, an invention of happiest utility, for which we are indebted to the French; the extreme neatness of construction, the delicate smoothness of surface, the ductility of substance, yielding to lateral pressure, and the accommodating flexibility of these instruments, rendering them infinitely preferable in many cases to those of metal; indeed, instances have occurred where the introduction of the latter proving impracticable, life has been preserved by the superior properties of these.

FIG. 16. The instrument of the late Mr. John Hunter to introduce caustic into the urethra for the destruction of strictures. This mode of practice has been lately most ingeniously improved by Mr. Home, and this instrument, in consequence, rendered of less estimation; but as this engraving was made previous to the improvement alluded to, I shall give a slight description of its construction. (a) a port crayon of gold to contain the caustic, attached to a silver fillet, by which it is conveyed through the external canula without danger of any lateral contact, till it reaches the stricture; (b) a fillet of silver, with a bulbous and perfectly smooth end, exactly adapted to fill up the inferior extremity of the canula, by which its abrupt edges are prevented from lacerating, or doing any injury to the internal coats of the urethra in its passage to the stricture; (c) the external canula, with the fillet (b) inserted: this, when arrived at the stricture, is withdrawn, and the fillet, furnished with the caustic, introduced in its place.

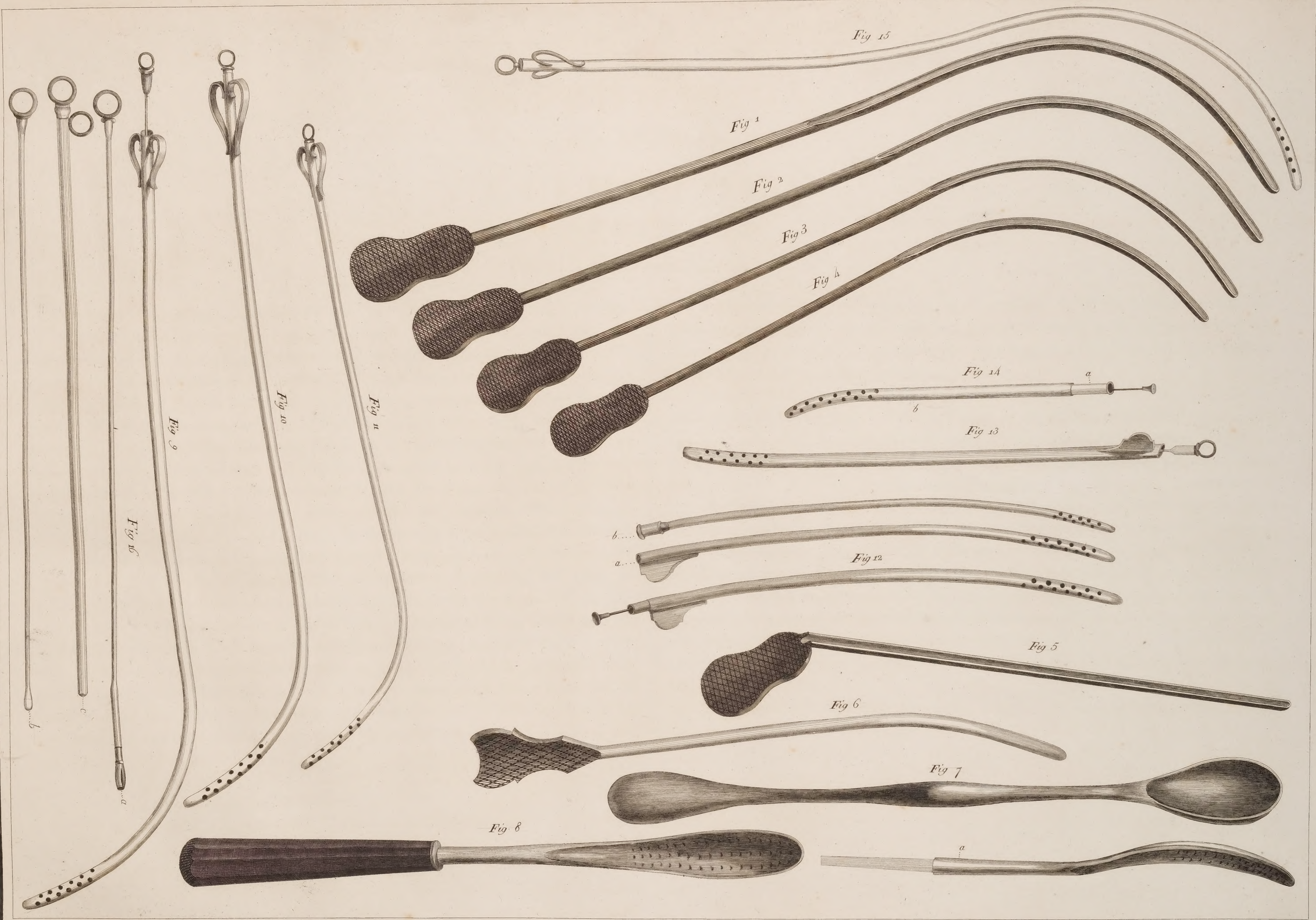


PLATE VI.
LITHOTOMY
CONTINUED.

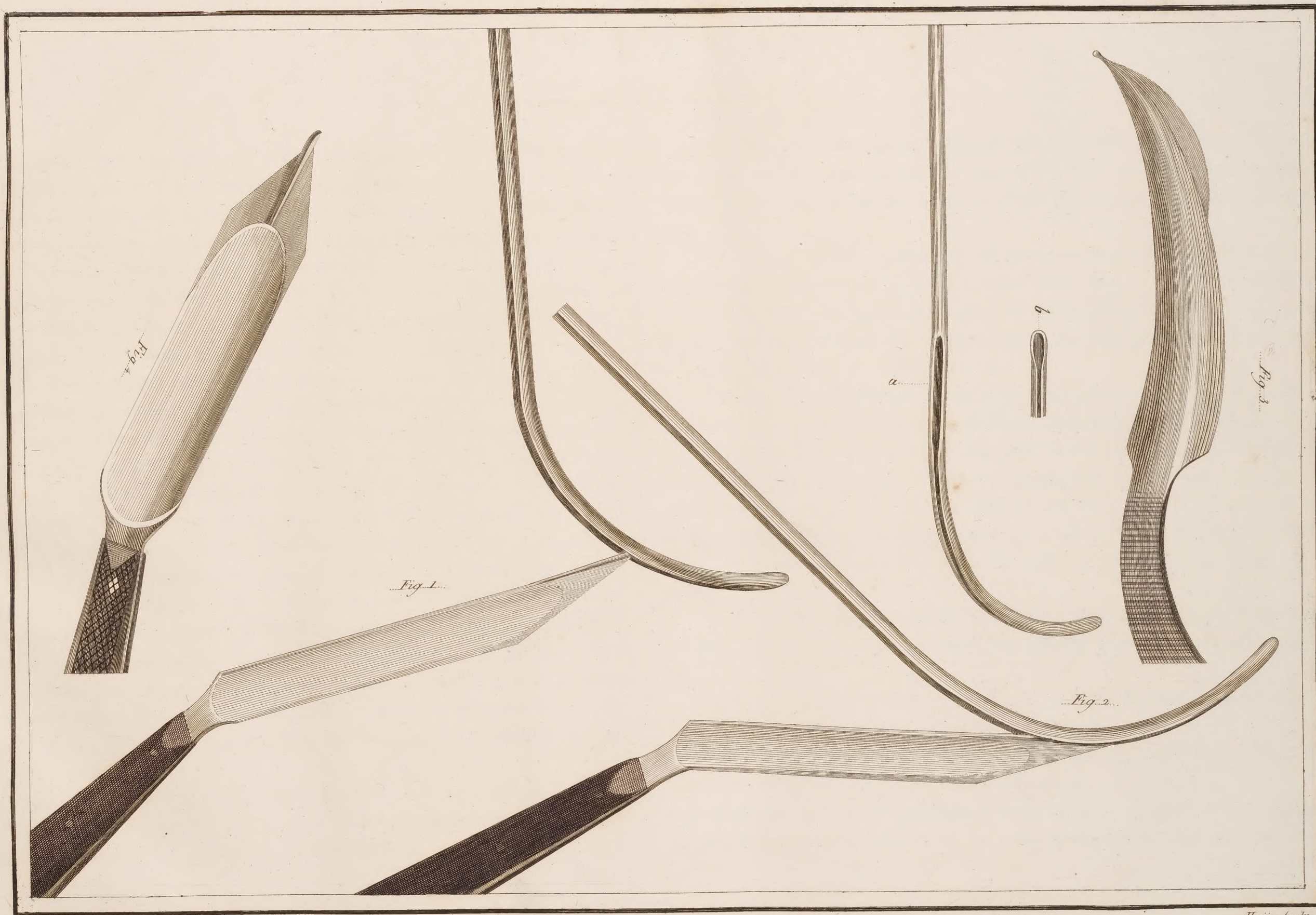
THE design of this Plate is principally intended to explain by comparison the advantage of the improved construction of the beak of the Gorget; and this, I trust, will appear sufficiently obvious, on an attentive consideration of the Figures 1 and 2, in which the different positions of the Gorgets as connected with the staffs during the operation, are accurately displayed. In the former (of the old make), it is evident that, to preserve the situation of the beak in the groove of the staff, the extreme point being only to be depended on, the direction of the instrument must be so essentially varied, that by the time it has reached the end of the staff, nearly its flat surface, instead of the edge, will be presented to the object intended to be cut; hence so great a resistance will arise as can only be overcome by a more powerful effort of the operator, and too often at the expence of unmerited censure of the instrument maker. In the latter, it is presumed, these inconveniences are effectually removed, as it appears that the prominence in the centre of the beak, (explained in Plate IV.) by meeting the curve of the staff in its progress, will retain its position in the groove throughout its whole extent, and by preserving to the edge its proper direction, will obtain a clean and easy incision. I am authorized to add an instance in which this improvement was attended with singular success. A gentleman of the first respectability, and of distinguished eminence as an operator, favoured this instrument with its first experiment on a subject fourteen years of age. It occurred that, during the operation, the boy had by some means receded a few inches from the edge of the table whereon he was placed; the consequence was, as my friend most obligingly and candidly assured me,

that had he been using an instrument of the old construction, this circumstance would have foiled him considerably; whereas with *this*, by only attending to the preservation of the contact of the gorget and staff, and advancing the former in a straight direction, he finished his operation with the most complete satisfaction.

FIG. 3. The Gorget and Staff, with a contracted groove, of Mr. Blicke; (a) the superior extremity of the groove of the staff open to receive the beak of the Gorget, and soon after contracting its edges to retain it till it arrives at (b), when it again expands to permit its exit. The apparent compatibility of the means with the ends proposed, which distinguishes this invention, and the ingenuity conspicuous in the general construction of the instruments, rank it very highly as a mechanical production, and in the hands of judgment and experience of valuable utility. In others it may be attended with two very important objections: it *is* possible, that the beak or button of the Gorget may become so obstructed or entangled in the groove of the Staff, as to occasion much perplexity to the operator in his wishes to accomplish some slight variation in the direction of the Gorget; and it is *more than possible*, that the consequent exertion may endanger the breaking off of the button, which, from its necessary form, is connected to the Gorget by so slender a neck, and composed of materials of so very brittle a nature, as to be liable to this accident from the most trivial causes.

FIG. 4. The Gorget with two edges, one on each side the beak, by Mr. Ashley Cooper.

.. PLATE VI..



Herij...Sculp...

PLATE VII.

CUPPING.

FIG. 1. The Scarificator used in this operation. I have lately made some alterations in the construction of this instrument, by which the difficulties complained of in producing the desired effect are removed, its general principles simplified, and its application rendered more easy and effective. It now consists of a square brass box of the dimensions represented, containing ten lancets (instead of sixteen as formerly, this reduced number being found amply sufficient, and affording at the same time more solidity to the internal work) attached to three pinions, acted upon by a dented roller, connected through the medium of a strong spring to the trigger (a); (bb) a brass moveable rim accurately fitted to the upper extremity of the box, and secured at any given height by a milled headed screw (a), Fig. 2, by which the depth of the lancets is regulated, their incision greatly assisted by an increased freedom of action, arising from a diminution of the resistance occasioned in the old instrument by the application and pressure of a flat surface immediately upon the skin; from this circumstance, I conceive, arose the complaint frequently made of the insufficiency of effect, and the consequent dissatisfaction attending the performance of this operation, the closeness of the contact between the instrument and the skin creating a resistance to the action of the lancets (however perfect their edges) which the strongest spring could not always overcome. As there is an essential difference between the mode of applying this instrument and that of the former construction, it becomes necessary to explain it more particularly: the depth of the lancets being previously determined by the adjustment of the rim, the trigger is to be pulled backwards till it remains fixed, and has changed the position of the lancets from the left to the right; the instrument held firmly between the thumb and middle fingers, is then to be applied to the skin, and the lancets discharged by raising the trigger with the fore finger.

Since this Plate was engraved a further slight improvement has been made by an alteration of the manner of discharging the lancets, now accomplished by pressing the trigger in a contrary direction to that which placed them for use.

FIG. 2. A second representation of the same instrument, to convey a more correct idea of the size and figure of the box, and of the openings in its upper surface to admit the passage of the lancets; (a) the screw by which the moveable rim is secured, (bb) the rim itself.

FIG. 3. A smaller instrument, of the same construction, furnished with only four lancets, particularly useful in various cases where the part intended to be scarified does not present sufficient extent of surface for the application of the larger one; it is also found a desirable substitute for leeches, when the scarcity of these useful agents, or the objections of the patient forbid their use.

FIG. 4. An exhausting Syringe to be connected to the glass, Fig. 5, by whose action the blood is extracted from the scarifications made by the instrument.

FIG. 5. A glass of the largest size used in this operation, the diameter of its mouth described by the circle below; this is furnished at its superior extremity with a brass mounting adapted to screw into the inferior extremity of the Syringe, and a thin leather valve tied across its top, and covering a small hole passing through it into the body of the glass; (a) a cap to be screwed over the head of the glass to defend the valve from injury.

FIG. 6. A plain glass, of the middle size, for the same purposes as the former; its effects produced by rarefaction, caused by holding it over a flame, and applying it immediately on the skin.

FIG. 7. A glass similar to the above, of a smaller size, and with an oval mouth, more conveniently applicable to confined surfaces.

FIG. 8. A brass lamp for the above purpose; it is used with spirits of wine and a cotton wick; (a) a cover for the end of the spout.

FIG. 9. A glass of a different form, to be connected to the Syringe, and to be applied after the small scarificator; (a) a cap to cover the valve, as in the larger one.

PLATE VII.

Fig. 3.

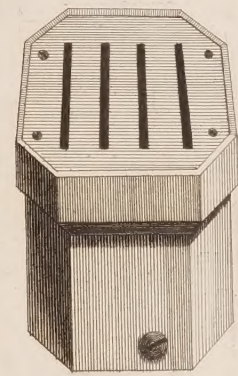


Fig. 1.

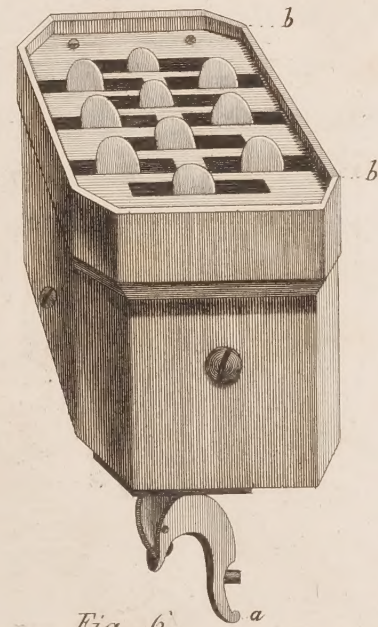


Fig. 2.

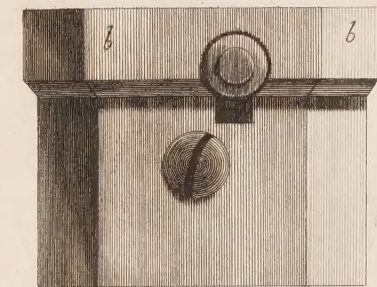


Fig. 5.

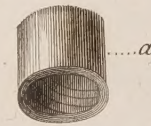


Fig. 9.

Fig. 6.

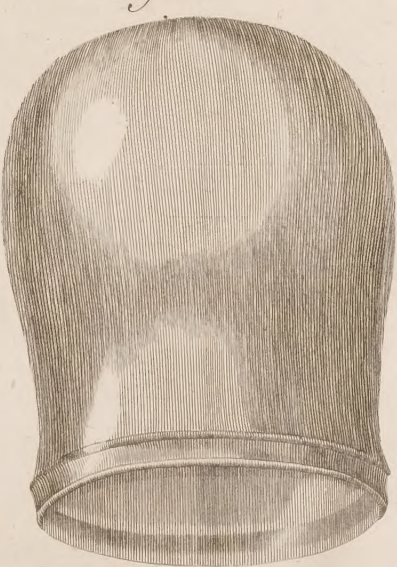


Fig. 8.



Fig. 7.

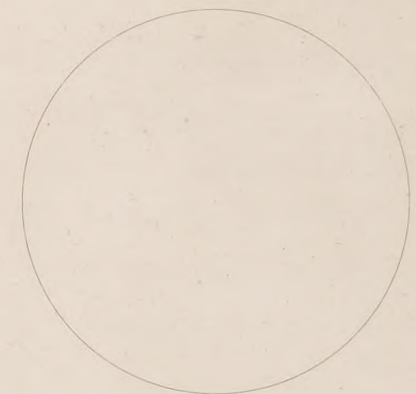
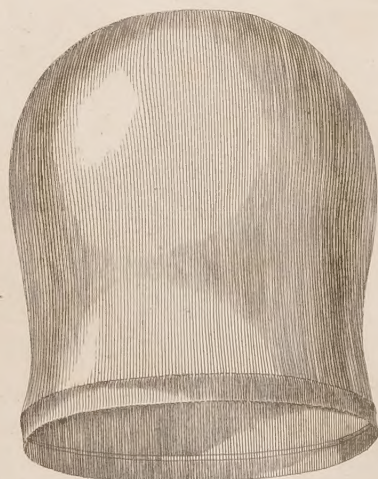


Fig. 4.

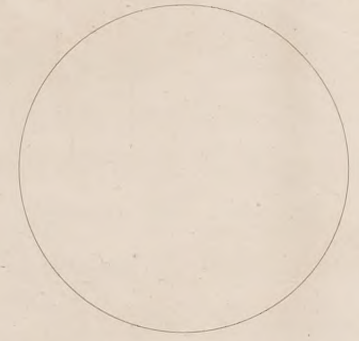
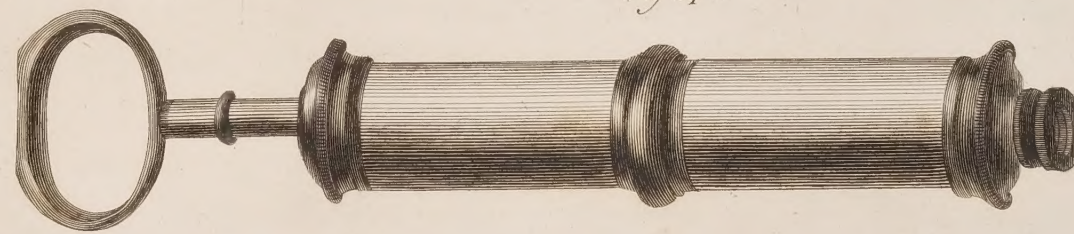


PLATE VIII.

IN this Plate are represented the instruments comprising what is termed the *Pocket Set*, from being the constant and indispensable companions of the surgeon's pocket, his practice continually requiring the use of one or other; of the first fourteen, (the two Directors, 6 and 7, being distinctly described, though *one* only is inserted, and the two Probes, 8 and 9, considered as one instrument) twelve constitute the full set usually made up; but as gentlemen differ in opinion respecting the number *actually* necessary, or are desirous of limiting them for the sake of more portable lightness, a smaller set is also arranged, consisting of the instruments marked 2, 3, 5, 8, 9, 10, 14, 16, 18, (less in dimensions, as well as fewer in number) these being generally esteemed sufficient for most common occurrences; and even these, thought too numerous by some practitioners, are still further reduced; to such the annexed Plate will furnish assistance in forming their own selection.

FIG. 1. The curved, or, as commonly termed, the Probe Scissars, an instrument now not so much in esteem as formerly, the Knife being preferred where it *can* be used, as performing its operation with superior neatness, and less pain to the patient; but as some cases occur where it is still convenient, it is constantly inserted in the full set. The lower, or narrow blade of this instrument, should be as small, and its point as round and obtuse as it will admit, and as nearly resembling a Probe; while the edges of *both* demand the nicest circumspection, to diminish as much as possible the effects of contusion, which, in some degree, are inseparable from its principles of action.

FIG. 2. The straight, or Plaister-box Scissars.

FIG. 3. The Dressing Forceps; by many the Dissecting Nippers (Plate IX. Fig. 2) are preferred for this use.

FIG. 4. The Spatula. This instrument is frequently made entirely of silver; but, as elasticity is its most desirable property, where it is not wholly of steel, or when wished to correspond with the uniform elegance of an ornamented set, it is made (as here represented) with its superior extremity or handle of silver, and the remaining part of well tempered polished steel.

FIG. 5. The Caustic Quill, or Case, calculated to carry the lapis infernalis at one extremity in the port crayon (a), and in the other (b) precipitate powder: this end is furnished with a row of small teeth, over which the nail of the fore finger being passed, a slight tremulation is produced that shakes out the powder upon the diseased part; (c) a hollow cover, which, screwed over the port crayon, defends the caustic from the air; (d) a small screw to shut up the small end of the precipitate case. This instrument is usually made of ivory, but the destructive effects of the caustic soon render it useless; sometimes of silver, which, though somewhat more durable, is in time affected in the same manner; and sometimes of gold: *this*, though considerably more expensive at the first, is in the end the most eligible, as from its property of resisting the pernicious consequences, its lasting durability will soon more than compensate the difference of expense.

A mode of strongly gilding those parts of the silver instrument which come into immediate contact with the caustic, has lately been adopted, which completely answers the intention of the gold one, and at considerably less expense.

FIG. 6. The Director, or grooved Probe, for conducting the point of a Bistoury into sinuses to be opened, furnished with a scoop by way of handle, occasionally useful in the extraction of extraneous substances from various parts, and sometimes with a flat obtuse pointed extremity, slightly curved, equally commodious as a handle, and more serviceable in removing dressings.

FIG. 7. The same instrument, with a ring to receive the fore finger (placed in a lateral direction with its groove) instead of the scoop; esteemed by many a more firm and convenient mode of holding it. These instruments are made either of silver or steel, though the former is, on all accounts, preferable.

FIG. 8, 9. Two Probes, one with a triangular point, the other with an eye.

FIG. 10. A curved Bistoury, with a button or probe point, better known by the appellation of *Pott's Bistoury*, from its being the instrument invented and used by that celebrated operator for the fistula in ano, but very generally useful in opening sinuses of various descriptions.

FIG. 11. The straight Bistoury.

FIG. 12. The full-pointed Bistoury, sometimes called a *Stone Knife*, from its similitude to the Scalpel, employed in that operation.

FIG. 13. A large Lancet, with one concave edge, for opening abscesses.

FIG. 14. The Gum Lancet. I have lately corrected the construction of this instrument by giving the cutting part an oblique direction, instead of forming it, as hitherto, at right angles with its stem, whereby a larger surface of edge is brought into contact, and its application rendered more convenient.

FIG. 15. The common curved Bistoury; an instrument now seldom used, as the straight Bistoury, Fig. 11, is found to fulfil all its purposes.

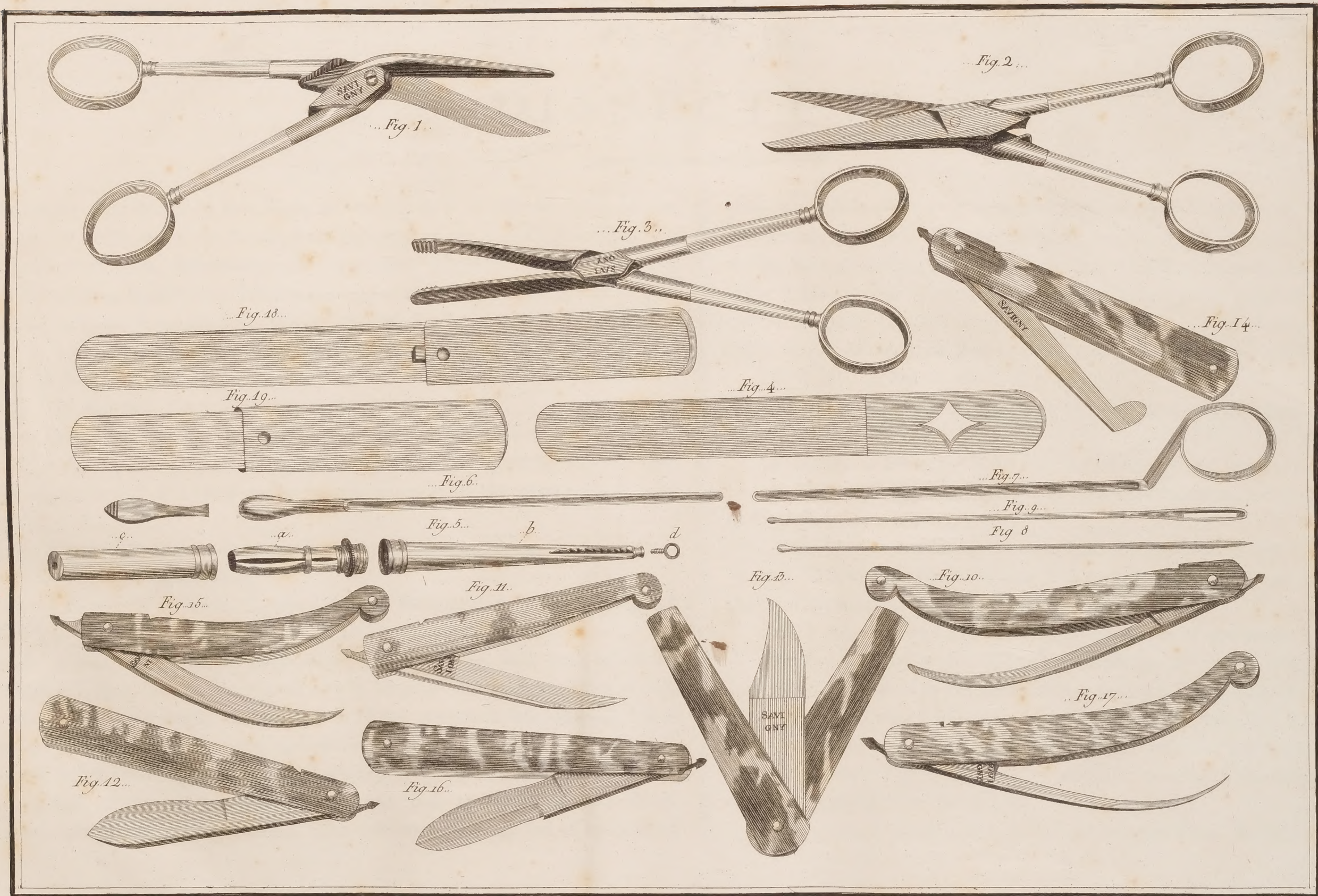
FIG. 16. The full-pointed Bistoury, with a double edge, inserted in the small set, answering the twofold intentions of knife and abscess lancet.

FIG. 17. A curved Bistoury, of the same form and dimensions as Pott's, but without the button at its point.

FIG. 18. A Spatula constructed to contract its length. As the only objection to the reduced size of the smaller selection of pocket instruments was the shortness of the Spatula, I contrived a mode of removing it, by forming nearly one half of the instrument hollow, into which the remaining part or blade being inserted, reduced it to a convenient length for the short case, and when drawn out, and fixed by a spring stop, as here represented, formed a Spatula sufficiently long for all its purposes, furnished at the same time with a commodious handle.

FIG. 19. The same instrument, exhibiting its dimensions when shut up.

.PLATE.VIII.



Herij. Sculp.

PLATE IX.

DISSECTING.

THE instruments represented in this Plate are employed in dissections; those in the lower compartment (with *one* of the hooks, and duplicates of Fig. 1 and 2,) compose the ordinary set; and when those, delineated in the upper part, calculated for more extensive purposes, or for opening bodies to investigate the causes of death, and the nature of previous disease, are inserted, it is called the full or complete set.

FIG. 1, 2, 3. Scalpels of various sizes, and the most approved forms.

FIG. 4. A Scalpel with a double edge.

FIG. 5. The common Hook.

FIG. 6. The double Hook, calculated to connect two distant parts.

FIG. 7. A double Hook, furnished with a stiff joint in its centre, by which it may be expanded or contracted according to the various distances of the parts wished to be connected.

FIG. 8. A pair of Scissors, of the most convenient size and form, for a variety of purposes occurring in this employment.

FIG. 9. A Blow-pipe of silver, slightly curved at its smaller end, for inflating the blood vessels.

FIG. 10. A pair of Forceps, or Nippers, for retaining many small parts while the Scalpel is employed upon them. Very great care is requisite in the construction of this seemingly unimportant instrument, and very much of the operator's satisfaction and success depends upon its perfection: its principal requisites are, ease in the spring, that the fingers may not fatigue by long retention, and accuracy in the points, that they may not slip aside from each other, and lose their object; both these properties are completely attained by the construction here represented. The instrument is composed of two distinct

parts, or blades, of properly tempered steel, connected together by rivets at their superior extremities, between which is previously inserted a flat piece of brass of the form of a wedge, with its thickest part towards the points; this gives them a degree of firmness, and, while it admits of the desired ease of spring, prevents the points from flipping aside; the outward surfaces in that part with which the fingers immediately engage, are cross-cut like a file, to render their hold more steady, and to resist the effects of moisture.

FIG. 11. A Saw for dividing bones.

FIG. 12. A second Saw, of a smaller size, on many occasions more convenient than the former.

FIG. 13. A strong Knife for dividing cartilages, and for many other useful purposes.

FIG. 14. A very thin Spatula, to introduce between and separate parts very closely connected.

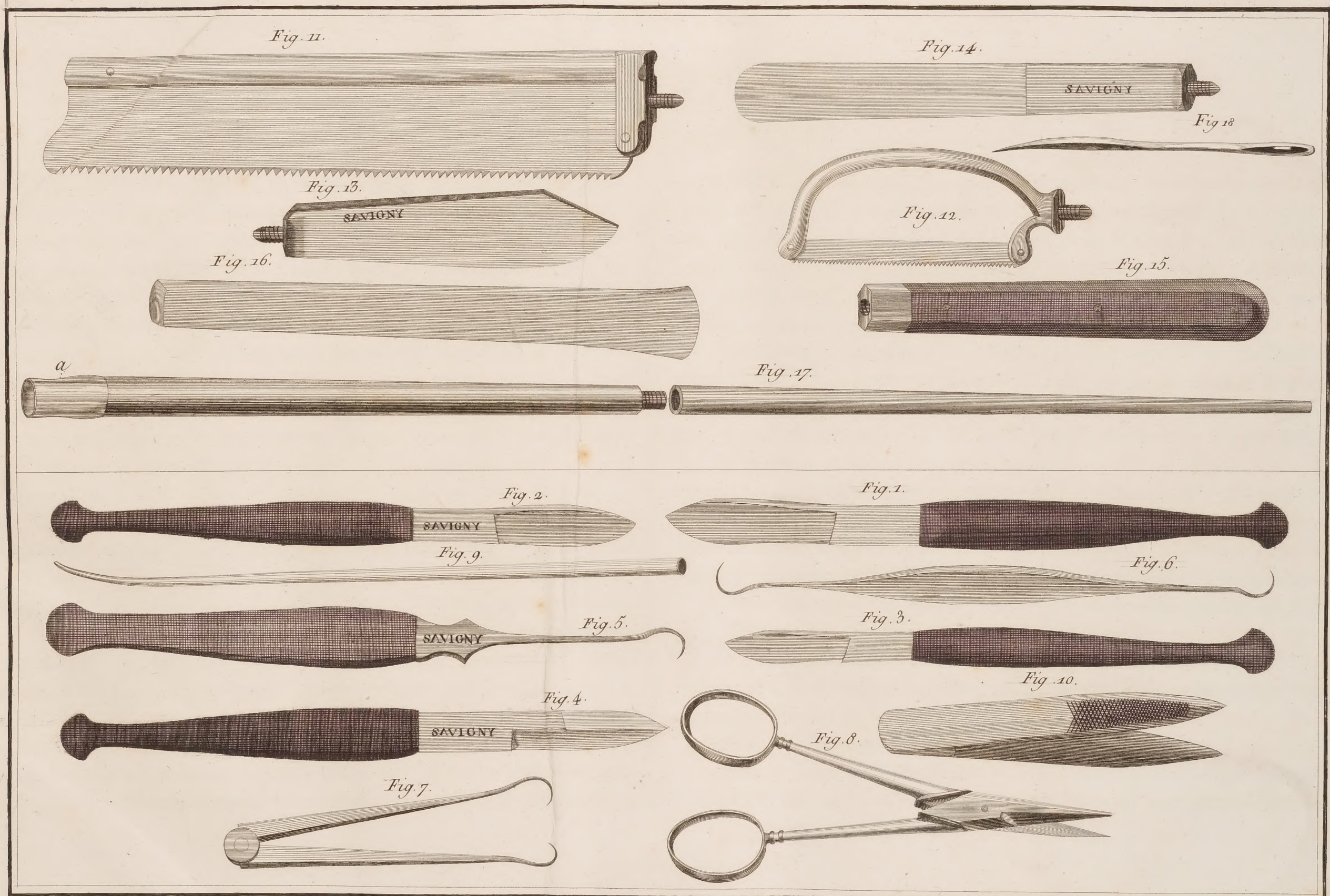
FIG. 15. A handle adapted to the four last described instruments, one being deemed sufficient for them all, and is detached to lessen the size of the case containing these instruments, and render it portable.

FIG. 16. A Chisel to force asunder the bones of the head.

FIG. 17. A Blow-pipe of brass, for inflating the vessels, with a screw in its centre, by which it is adapted to the dimensions of the case, and attains a more convenient length when the subject under dissection, from length of time, may have become somewhat offensive; this length may be yet further increased by inserting its smallest end into the largest of the silver one, Fig. 9; (a) an ivory mounting to remove the disagreeable effects of the metal on applying it to the mouth.

FIG. 18. A Needle, of a convenient size and form, for sewing up bodies.

PLATE IX



Hery sculpt

PLATE X.

MIDWIFERY.

THE instruments represented in this and the three succeeding Plates, intended for, and employed in, obstetric uses, being always made under the immediate directions of the different professors who recommend their various constructions, very little is left for the instrument-maker to advance respecting them, I shall therefore (as premised in the Preface) confine myself in their description to the names of their respective authors, referring to their lectures and other publications for more ample details of their nature and properties. I must not, however, on this occasion, omit my grateful expressions of acknowledgment to my respected friend Doctor Pole, who has contributed an entire Plate (the Thirty-seventh), and has accompanied it with most complete and intelligent explanations.

These instruments are delineated in their full and proper sizes, and in positions the most favourable for the true representation of their figures and substances.

There has long existed much variety of opinion respecting the mode of finishing these instruments, that is, whether they should be entirely covered with leather, or the handles only; or whether they should be left wholly uncovered, and their external surfaces highly polished: the only convenience gained by the former, I believe, consists in the possibility of their joints being connected, during use, without the noise which might occur in the junction of the latter, and thereby alarm the suffering patient, or the timid attendants; but this slight utility is more than counterbalanced by the greater disadvantage arising from the necessity of their very frequent repair, rendered more peculiarly so by the possibility of the absorbent nature of the leather retaining and communicating disease; on this account, I have ever recommended the latter, especially to country practitioners, to whom the objection stated above becomes almost insuperable, from the difficulty, not to say impossibility, of having them covered afresh as often as they absolutely require it.

I will venture to suggest another consideration, which may induce a further preference to the polished instrument, and this is no less important than the superior degree of ease with which its introduction may be effected; the removal of the substance of the leather (however trivial) and the unresisting smoothness of surface, contributing to facilitate this desirable intent, while the difference in the effects of compression upon the head of the foetus cannot, by any means, become an object of consideration.

Having thus endeavoured to establish the superiority of the polished instrument, it remains only to furnish the workman with some general hints respecting its finishing, in which the greatest care must be taken to round off every edge at all likely to be brought into contact with the infant's head; the inside flat surface of the blades should be left very slightly rough (that degree of roughness produced by drawing them across a very low and coarse grindstone being sufficient), the external surfaces perfectly well polished, and thinned gradually from the opening in the centre, forming a regular convexity, till the whole surrounding external line terminates in a perfectly round and smooth edge; the joints too must be very accurately adjusted, so as to connect perfectly easy without being too loose.

I now proceed to explain the different instruments contained in the annexed Plate.

FIG. 1. The straight Forceps of Doctor Denman.

FIG. 2. One blade of those recommended by Doctor Osborne, differing from Fig. 1 only in being furnished with a curve edgeways, which gives the points a degree of elevation above the line of the handle.

FIG. 3. The short Forceps of Doctor Lowder.

FIG. 4. A second instrument by the same author, of a similar form and size of blade, but with an elongation of the joint, by which they are calculated to unite externally.

PLATE X.

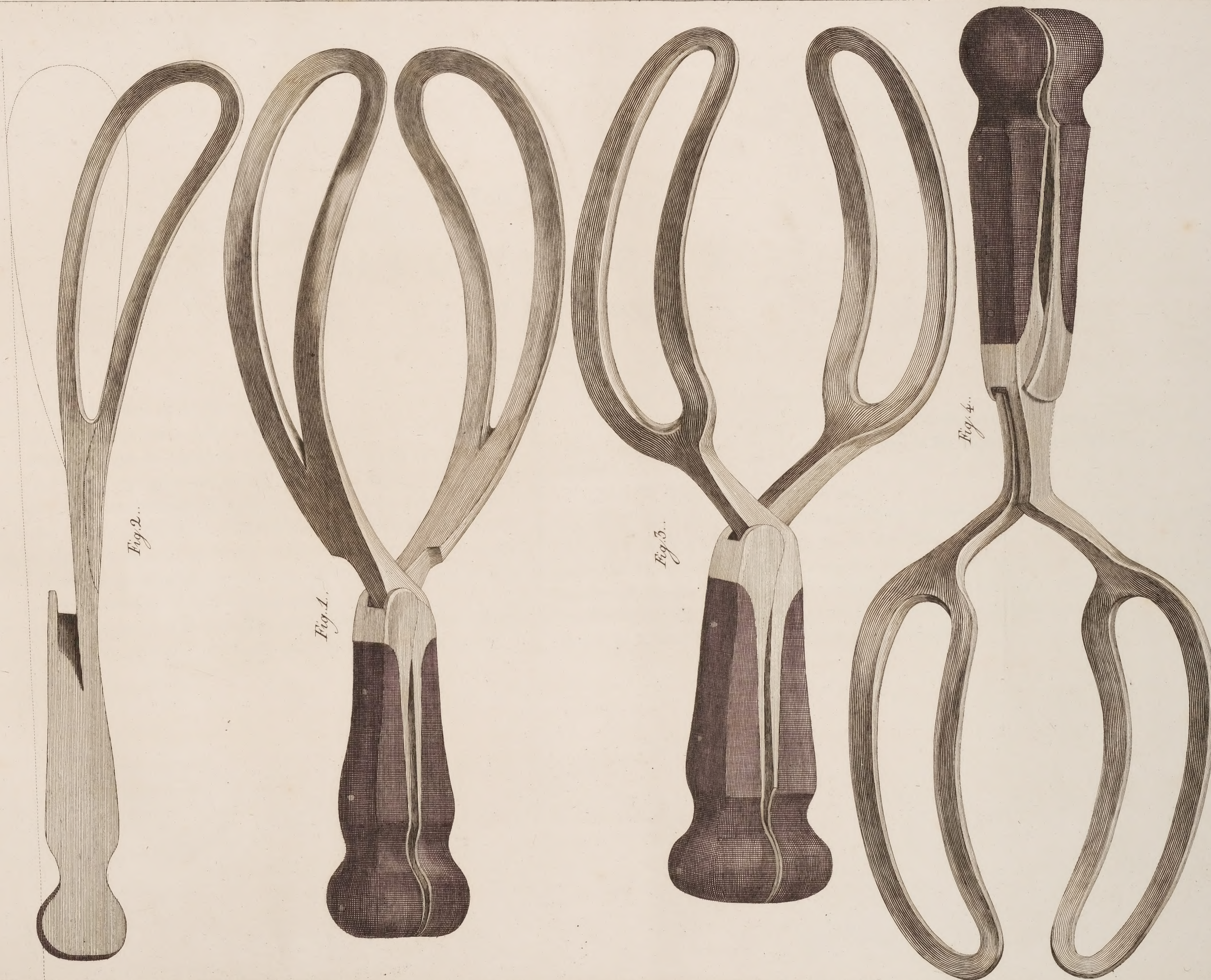


PLATE XI.

M I D W I F E R Y

C O N T I N U E D.

FIG. 1. The Vectis, or single blade, of Doctor Lowder.

FIG. 2. The same instrument, with a joint at the inferior extremity of the handle, to render it more portable; it is also in this place furnished with a sliding bolt with two points, which, when pushed forwards, enter two corresponding holes in the joint, and renders the instrument, when open, as solid and steady as if formed of one piece of metal.

FIG. 3. The Sliding Vectis of Mr. Trye. This instrument is very ingeniously constructed, and unites to the advantage of portability *that* of affording various lengths, which differing circumstances may require; when drawn out to its fullest extent it is secured by a spring catch from receding or from coming entirely out.

FIG. 4. The same instrument in its shortest dimensions, that is, when its blade, or inferior extremity, is pushed home into the iron sheath which forms part of its handle.

FIG. 5. The Vectis of Doctor Bland.

FIG. 6. The Single Crotchet of Doctor Denman, of its proper dimensions and curve; (a) a front view of its point, by which its exact form and breadth are described.

FIG. 7. The common Blunt Hook.

These different Vectes are formed of steel, of sufficient strength and temper to prevent their yielding to the violence of the necessary exertion. The same care must be taken in the construction of these as has been recommended in that of the polished forceps, in regard to the roundness and smoothness of the edges; the internal surfaces too should be left rough, excepting that their points, or, as they are termed, their lips, should be smooth and convex within as well as without.

PLATE XI

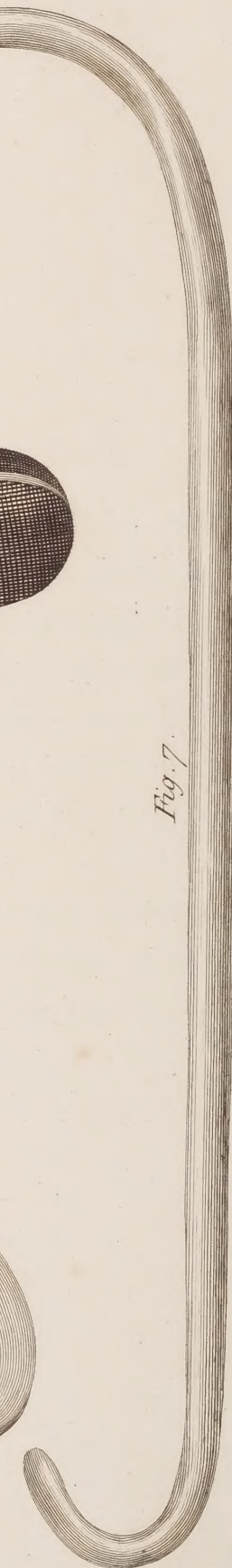
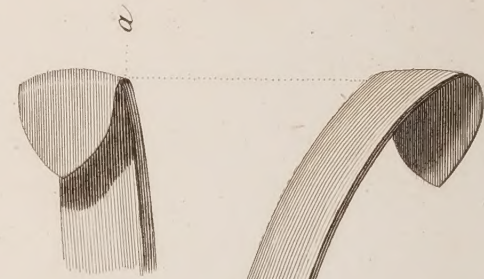
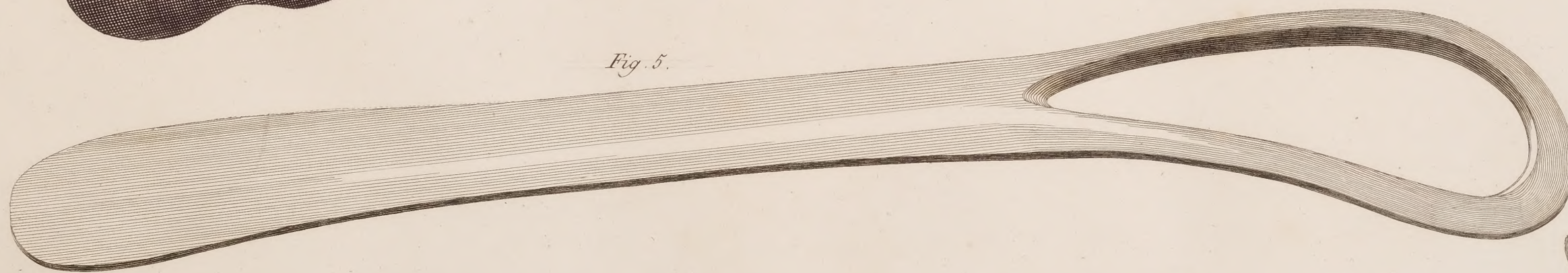
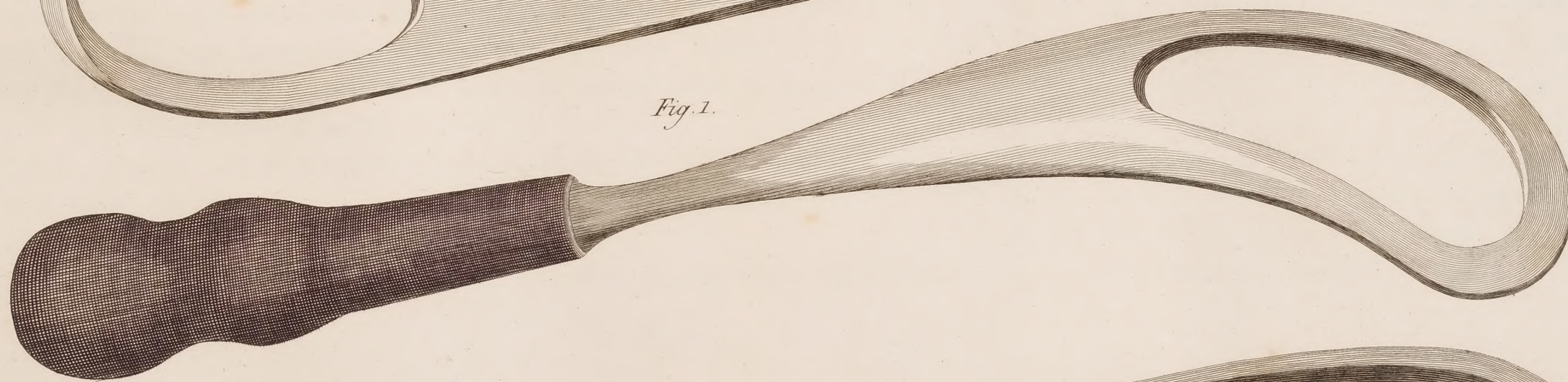
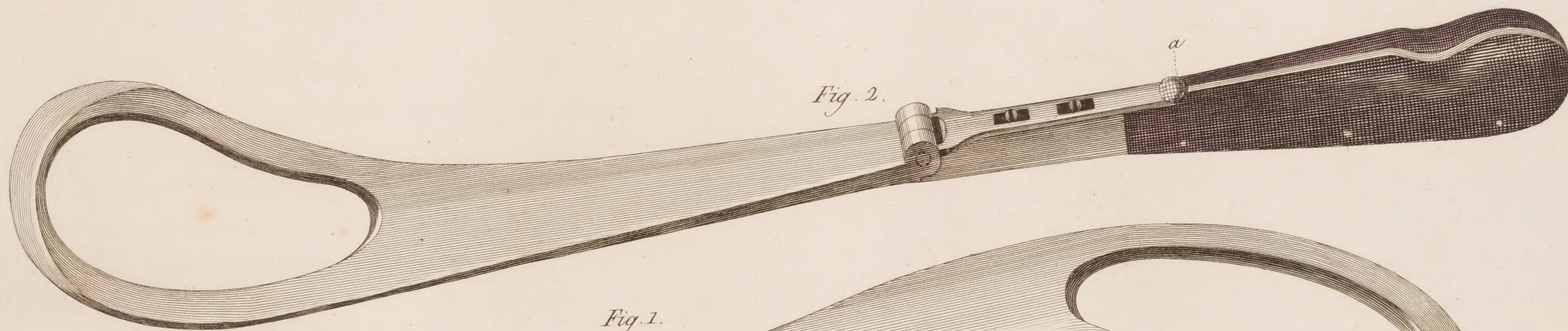
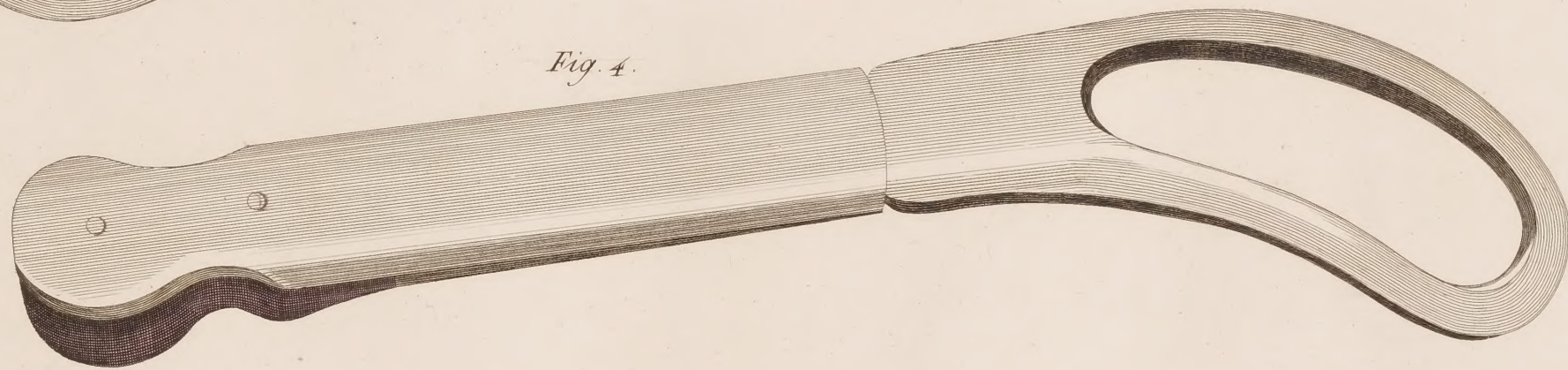
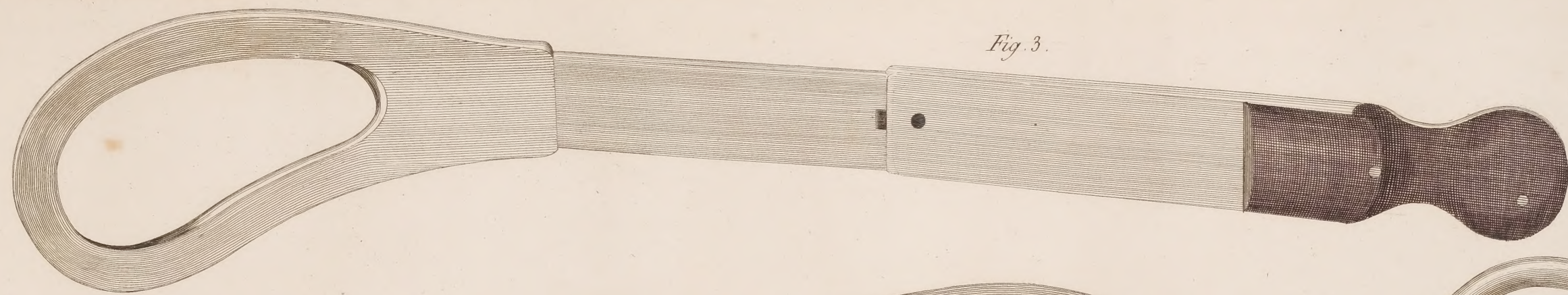


PLATE XII.

M I D W I F E R Y

C O N T I N U E D.

FIG. 1. The Forceps of the late Doctor Leake, with the third blade, or lever, attached.

FIG. 2. The Lever separate, exhibiting two small circular excavations on the internal and lower part of its handle, which act upon a pivot fixed to the inferior joint of Fig. 1.

FIG. 3. A pair of Perforators for penetrating and opening the cranium of the fœtus. The points of this instrument from the shoulder or stop, are of a triangular form, the external or acting edge constituting one of their angles, are slightly curved, and their internal flat surfaces furnished with small teeth, to enable them to lay hold of small pieces of bone when employed for this purpose.

FIG. 4. The Crotchet and Blunt Hook united, by Doctor Clarke. The centre of this instrument, which furnishes a handle to either extremity, is covered on both sides with ebony.

FIG. 5. A front view of the breadth and dimensions of the point of the former.

FIG. 6. The Tire Tete of Mr. Cruikshank. This instrument is furnished with a short piece of steel of the delineated form, attached by a loose joint in its centre to one of its extremities, the other acting occasionally as a blunt hook.

FIG. 7 represents the end of this instrument with the piece of steel, in the position in which it is introduced into the head: when it has entered beyond the inferior extremity, a slight attempt to withdraw it engages its curved point with the edges of the bone, and, by the easy action of the joint assuming a transverse direction, it becomes fixed within the head.

FIG. 8. A pair of Scissors, for dividing the funiculus umbilicalis: they are short, for the convenience of the pocket, the blades very strong, and convex upon their external surfaces, except towards their points, which are flattened, and their extremities finished perfectly round and smooth.

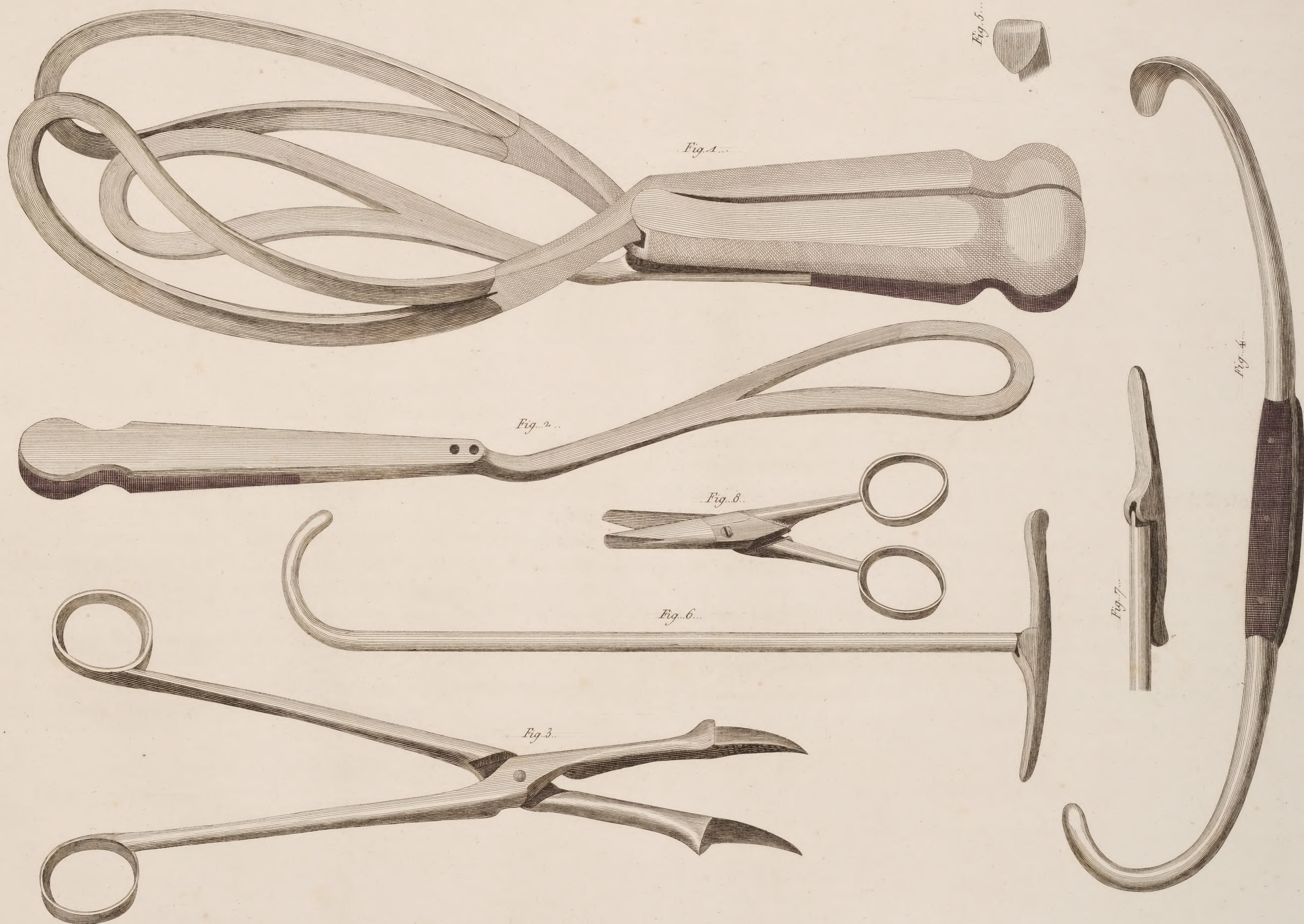


PLATE XIII.

M I D W I F E R Y

C O N T I N U E D.

FIG. 1. The Spring Crotchet of the late Doctor Leake; an instrument in which ingenuity and utility are conspicuously combined. The principal design of its mechanism is to enable the operator to disengage its point with facility and expedition, should its application prove, at any time, improper or dangerous: this is most readily accomplished by sliding it a little backwards, and removing the pressure of the thumb from the superior extremity of the lever (aaa), which raises or depresses the point at pleasure; (b) the point in close contact with the blade of the instrument, kept in this position by a spring screwed into a groove in the internal part of the end of the instrument (as seen in Fig. 2) acting upon a small tongue fixed to the interior part of the point; (cc) two deep narrow grooves cut in each extremity of the left side of the blade, to receive the thinned ends of the lever, and to retain it in its parallel situation; (d) a screw which adds to this effect, and acts at the same time as a centre or fulcrum.

FIG. 2. The same instrument, representing a front view of its internal or concave surface, with the position of the lever; (a) the lever, (b) the point.

FIG. 3. A section of this instrument, exhibiting the action of the lever in raising the point when its superior extremity is pressed upon by the thumb; (a) the lever, (b) the point, (c) the groove in the end of the blade, (d) the screw.

FIG. 4. Another section, explaining the action of the spring upon the small tongue in drawing down and retaining the point close to the blade when the lever is freed from pressure.

FIG. 5, 6, 7, 8, represent a set of Midwifery instruments, most conveniently portable, consisting of a Vectis, Crotchet, and Blunt Hook, with one handle, to which they are occasionally connected by introducing the square extremity of each blade into the socket of the handle furnished with a spring, one end of which falling into the notch, secures it perfectly firm. As some inconveniences have been apprehended from the asperities about this part of the instrument, inseparable from this mode of uniting it with its handle, I have since adopted another, whereby they are completely done away; this will be found fully explained in the Thirty-seventh Plate.

Fig. 5.

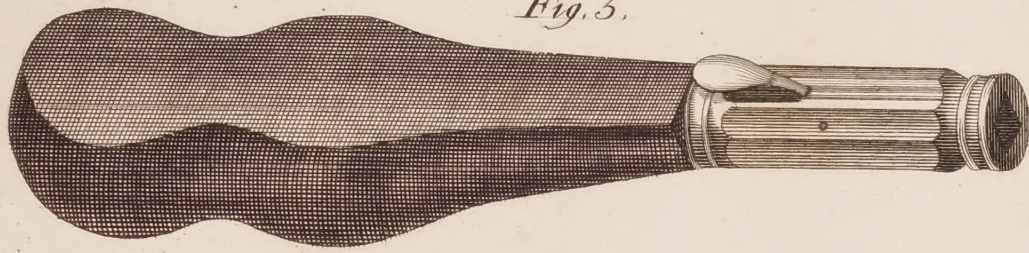


Fig. 6.



Fig. 7.



Fig. 8.

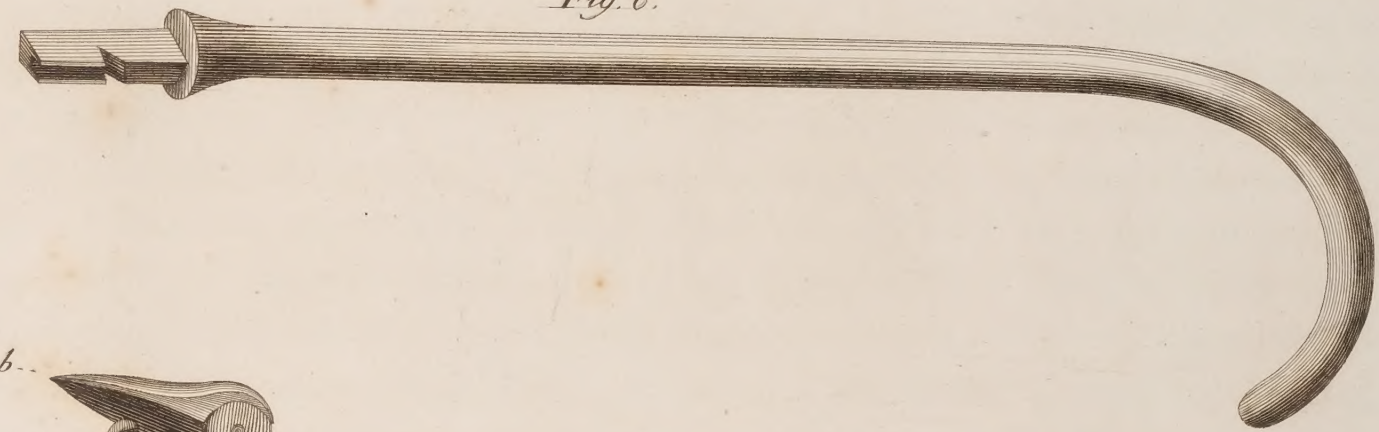


Fig. 4.

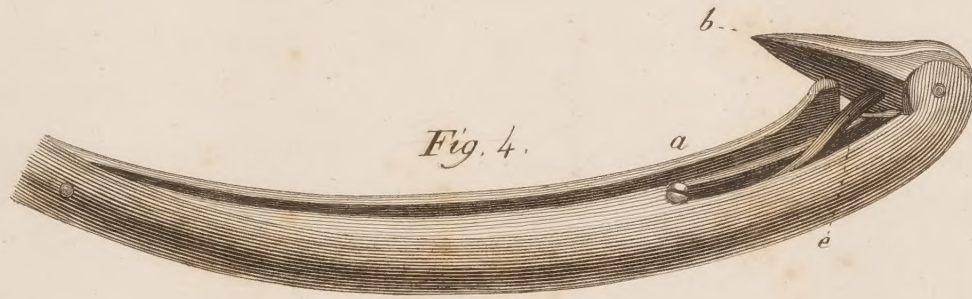


Fig. 3.



Fig. 1.

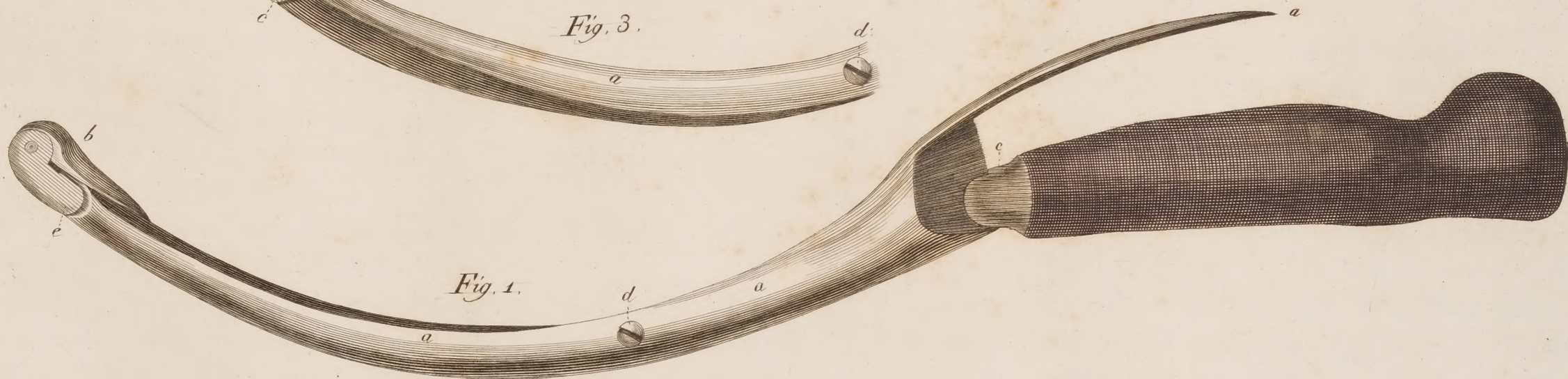
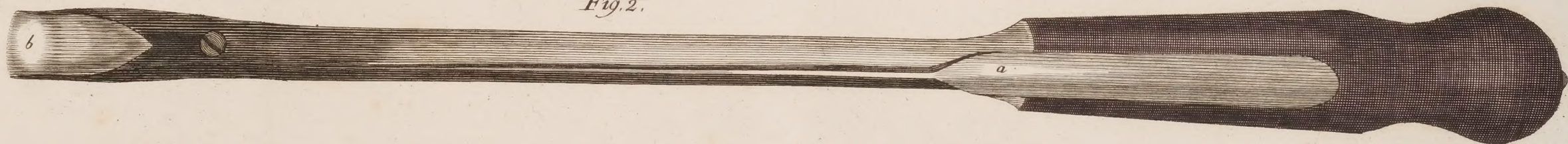


Fig. 2.



P L A T E X I V .

T E E T H .

THE instruments contained in this and the next ensuing Plate are calculated for operations perhaps the most general of any in the whole Catalogue, scarcely any person in existence but at some time or other experiencing the necessity of their use; and as certain considerable pain, and sometimes danger, attends their application, ingenuity has been very extensively exerted to form such as may possess the most probable tendency to lessen both. It would be impossible to represent all the contrivances that have been made for the various contingencies of these operations, as many of them never appear at all; the inventors (when successful) making a point of keeping them profoundly secret, and reserving to themselves the exclusive merit resulting from the improvement their ingenuity may have adopted. I have therefore confined myself to those which, as a maker, I have been enabled to ascertain to be in most universal use and estimation.

FIG. 1. The Key instrument, improved from the common one by a curve at its extremity, and an alteration in the construction of its bolster, both manifestly tending to the advantage of its principles of action; the former rendering its application more convenient and adding to its powers, and the latter furnishing a fulcrum better adapted to its design. It is here represented with its handle moveable, to which when used it is fixed by the notch (a) in the squared end of its stem, receiving the spring catch (b) on the superior part of the handle; (c) a small projecting extremity, to which the claw may be occasionally attached for its more convenient application to the dentes sapientiæ; a milled head screw, with which the fingers easily engage, is found the simplest mode of fixing or exchanging the position of the claws.

FIG. 2. The old, or common Key instrument, introduced by way of comparison with the former, with a straight stem and plain bolster.

FIG. 3. A smaller instrument, of the same construction as Fig. 1, and of a size better adapted for the extraction of children's teeth. I have shewn *this* with the inferior part of its bolster rough, and the *former* smooth; as this is a consideration in itself of no very great importance (this part of the instrument when applied being usually defended by a linen compress), but about which opinions differ, I have represented them both, that operators may themselves decide when they make their selection.

FIG. 4. The instrument invented and used by the late Mr. Rae for the extraction of the dentes sapientiæ.

FIG. 5. A Key instrument which I have lately invented, and in the construction of which I have aimed as much as possible at the combination of simplicity with effect. The complaints I had long been accustomed to hear of the difficulty and danger attending this operation, led me to conclude that somewhat essentially deficient must have existed in the construction of the different instruments hitherto employed to perform it.

On comparing and reflecting on the various forms which the Key instrument has received, I have ever found their principal defect to arise from the depth of bolster, which, even in the smallest, describes in its action so large a circle (the stem or shank of the instrument considered as its centre) as to occasion unavoidable inconvenience; and in the larger, or deeper ones, certain danger of fracturing the alveolar process, and of being followed by consequences always painful, and frequently dangerous. The violent effects of so powerful a fulcrum have usually been increased by a curve, or neck, at the inferior extremity of the instrument (as in Fig. 1), for the purpose of laying more commodiously over the front teeth when employed in the extraction of the molares in the internal direction; an alteration which, although it effected its design, still augmented the inconveniences stated above to a very considerable degree. The advantages of this curve are preserved, and its danger completely removed in the construction of the instrument now under consideration. For this essential improvement I acknowledge myself indebted to a very ingenious paper communicated by Mr. Robert Clarke of Sunderland, and inserted in the Sixth Volume of Medical Facts and Observations. I found it admirably calculated to assist the mechanical intention of the circular bolster I have adopted; the action of which, confined to a revolution upon its own axis, raises the tooth in nearly a perpendicular direction. A bolster of this shape applies without violence to the process, and by presenting a regular obtuse surface to the gum, lessens the danger of bruising or laceration, while it affords at the same time a resisting point to the claw in whatever position it may be engaged. The instrument is here represented of its proper size and figure; the dotted line is intended to explain that, notwithstanding its advantageous curve, its action is perfectly central, and in a right line with its handle. (a) a milled head screw retaining the claw; (b) another screw with a milled head securing the handle, which by this means is easily either wholly removed, to render the instrument more portable, or its position changed (horizontally or vertically), as may be occasionally required.

FIG. 6 shews the bolster of the instrument, with the claw attached to the projecting extremity, for more conveniently fixing it on the dentes sapientiae.

FIG. 7 exhibits a front view of the bolster, to describe its form and circumference.

FIG. 8, 9 the dimensions of the points of the claws, the only difference of size requisite in this instrument.

FIG. 10 represents the bolster and curved neck of the common instrument applied to a tooth, the dotted line (a) pointing out the nearly angular direction of its action, renders any comment upon the probable consequences unnecessary.

FIG. 11 shews the bolster and claw of the improved instrument, also applied to a tooth, by which the comparative difference of the powers of the two instruments may be easily ascertained.

FIG. 12. The Spring, or, as it is commonly termed, the German Key. It is furnished with a swivel which receives the claw, and which, by moving round upon the upper surface of the bolster (a), changes its position, and becomes fixed by the extremity of a spring catch (b), let into the stem of the instrument, falling into one of the notches in its base. This is represented with a spring joint (c), (equally applicable to all others) by means of which it folds up in a convenient compass for the pocket.

FIG. 13. An instrument termed a Pulican, approved by many for the extraction of the incisors; to increase or diminish the distance between the point of the claw and the

extremity of the bolster (as different sized teeth may require), it is furnished with a screw (a) passing through the length of the handle (secured from coming out by a pin lodged transversely through the superior extremity of the handle, and a corresponding groove in the flank of the screw), and acting in the concealed end of the upper piece (b), to which the claw is attached, and which slides through a dove-tail (c), in the main body of the instrument.

FIG. 14. An instrument invented by the late Mr. Rae for extracting the incisors of children by raising them perpendicularly; its points (a), are constructed to recede from, or to approach each other, by exactly the same contrivance as the former one; (b) the head of the screw employed for this purpose.

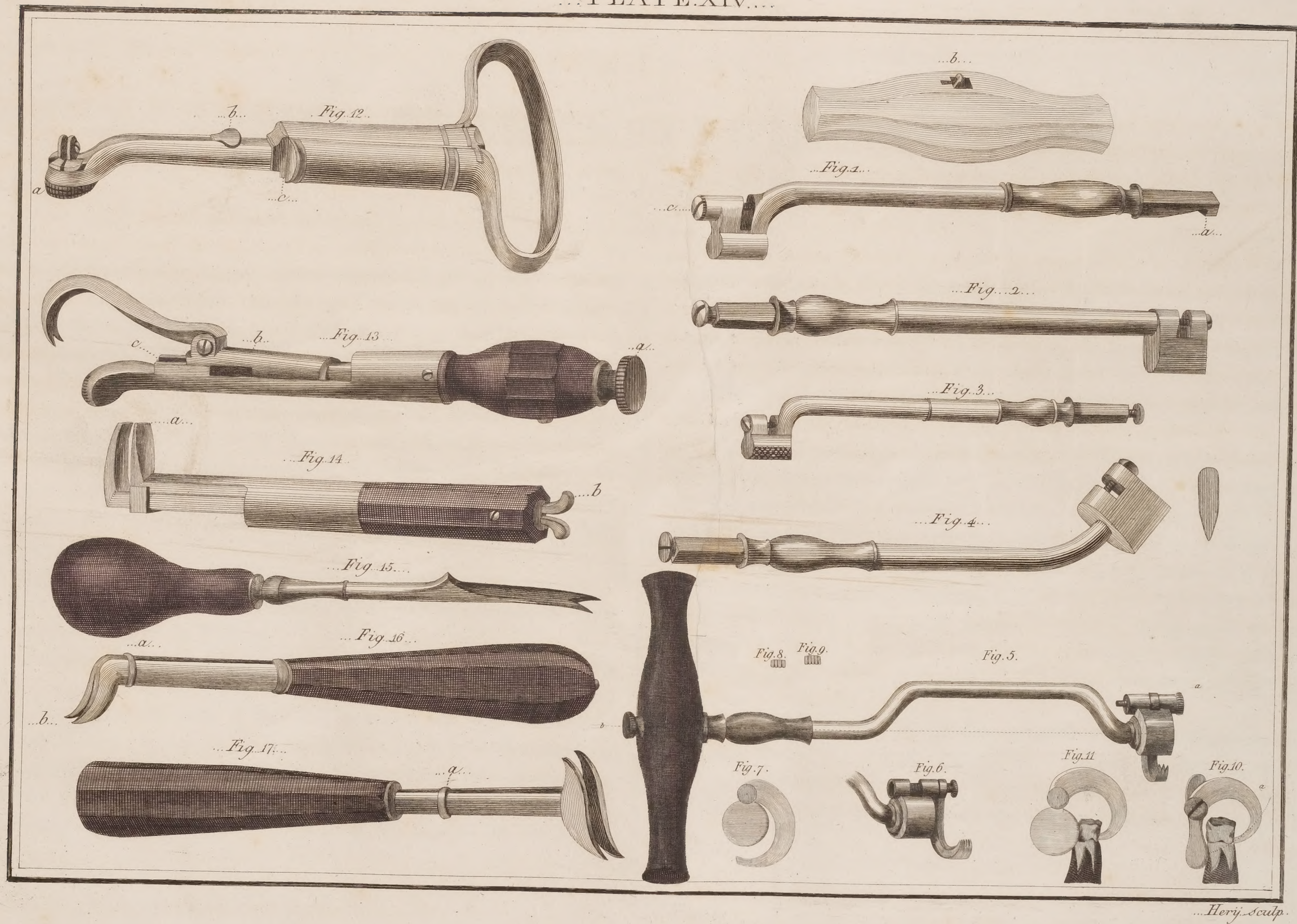
FIG. 15. A common Punch for extracting stumps.

FIG. 16. The Goat's Foot, or Punch, of Mr. Rae. In addition to the supposed superiority of form, this instrument possesses the desirable convenience of varying its dimensions, the points being expanded or contracted by shifting the small ring (a) upon the stem backwards or forwards.

FIG. 17. An instrument of a similar construction as to its general principles, but furnished with double points in different directions, that the operator may vary its application as circumstances may require; (a) a moveable ring, as in Fig. 16, by which the points are contracted or expanded.



...PLATE XIV...



P L A T E X V .
TEETH INSTRUMENTS
C O N T I N U E D .

FIG. 1. A pair of Forceps, or, as they are commonly termed, Paces, for extracting stumps, or removing the tooth after it has been disengaged from its socket, but not entirely brought away by the Key instrument: these have their points bent in a lateral direction, and forming an obtuse angle with the joint, from which they derive the denomination of Side Paces; (a) a front view of their points when closed, by which appears a curve on each blade, leaving a space above the points; this confines their action solely to the root of the tooth, without interfering with its crown, which otherwise would act as a wedge, and by extending them defeat the intentions of the instrument. The points are slightly concaved on their interior surfaces, and furnished with small teeth to render their purchase more secure, and the external surfaces of the handles are roughed to give them firmness in the operator's hand.

FIG. 2. A pair of Forceps, or Straight Paces, for similar purposes with the former.

FIG. 3. A pair of Front, or Hawk's-bill Paces, for extracting the incisors, upon principles nearly similar to those of the Pulican.

FIG. 4, 5. Two pair of Straight and Side Paces, of smaller dimensions, for extracting children's teeth.

These instruments are usually made of iron case hardened; but as this species of superficial temper cannot always be depended on, and the instruments sometimes requiring considerable exertion in their application, to prevent the mortifying disappointment of their failure, I would ever recommend them to be made of steel.

FIG. 6. An instrument termed a Lever for forcing out stumps, for which it is

admirably calculated: the point insinuated down to the root of the stump readily raises it from the socket; it is constructed of one entire piece of steel, the handle formed by a scale of ebony rivetted on each side; it is of the substance delineated, and convex on both sides till towards the point, where the internal surface is flattened.

FIG. 7. A similar instrument, with an obtuse point, representing its external or convex surface.

FIG. 8. A collection of Gum Lancets, of different constructions, in one handle of ivory. This is a contrivance of peculiar utility, furnishing the operator with three most necessary instruments in a commodious compass, whose varying forms enable him to detach the gum from the tooth previous to its extraction in every possible direction; (a) the common shaped Lancet; (b) a Lancet whose cutting part is placed in a vertical direction at the extremity of the stem, intended to be applied transversely between the hinder teeth; (c) a third blade, of a very useful form, distinguished by the name of the Gum Knife: the handle is formed of one solid piece of ivory, divided to receive the respective blades, (b) occupying the centre; (a) and (c) the two sides, each furnished with a spring like a pen-knife.

The remaining figures of this Plate comprise the set of instruments usually made up (excepting that, unless desired, only one file is inserted) for cleansing and scaling teeth: this selection comprehends all the instruments necessary for these purposes, and that are generally used, though some operators vary them still further, agreeably to their different ideas.

...PLATE...XV...



Hery...Sculpt...

stem, of a most convenient form, for retaining either of the eyelids during many operations to which these parts are liable.

FIG. 10. The Forceps of Mr. Wathen for extracting the Capsule of the crystalline humour. This instrument requires particular accuracy in its construction: the points, in the form of two small rings, are convex externally, and concave within; and should meet in such a manner that the internal edges of the circles should approach in most perfect contact. This form is found more certain for holding soft pulpy substances, than small sharp points.

FIG. 11. The Forceps of Baron Wenzel for the same purpose.

FIG. 12, 13. Two Knives, of different sizes, of Messrs. Wathen and Phipps, for making the section of the Cornea in the extraction of the Cataract.

FIG. 14. The Knife of Professor Richter.

FIG. 15. The Knife of Baron Wenzel.

N. B. The marks near the points of these instruments are intended to shew how far the cutting edge should extend upon the back for facilitating the entrance of the point.

FIG. 16, 17. Two small curved Knives, with blunt points, for occasionally enlarging the section of the Cornea.

FIG. 18. The Needle of Mr. Earle for depressing the Cataract. It is convex on one surface, and flat on the other; on the latter it is furnished with a small longitudinal roughish groove.

FIG. 19. The Needle of Mr. Pearson for the same operation.

FIG. 20. A small curved Needle for scratching the Capsule, and the silver Curette for extracting small remains of the crystalline, fixed in one handle.

FIG. 21. The instrument of Mr. Cline for scratching the Capsule. It is constructed of silver, having at its extremity a small round flattish head, to which is fixed at right angles an exquisitely sharp steel point.

FIG. 22. A small fine steel Hook for assisting the extraction of the Capsule.

FIG. 23. A pair of thin Scissors, with short blades and rounded points, curved slightly upon their flat surfaces for enlarging the section of the Cornea, and for a variety of other purposes in these operations.

FIG. 24. The Cyftotome of La Faye; an instrument in considerable estimation for wounding the Capsule, as it can be conducted to it perfectly concealed, and consequently free from the possibility of doing injury to the adjacent parts. It consists of a very small and delicate Lancet (a), enclosed in a flat silver sheath connected to a cylinder, containing a spiral spring, by which its point is exposed or hid; when used it is pushed forward by pressing with the thumb upon the button (b); (c) a nut upon the screw on the stem, projecting beyond the superior extremity of the cylinder, to regulate the length of the point; (dd) two rings affixed to the sides of the cylinder, to receive the fore and middle fingers, by which it is thus held perfectly steady.

INSTRUMENTS FOR OPERATIONS ON THE EYES.

THIS Plate is allotted to represent those most approved for extracting and depressing the Cataract. As it would greatly exceed the compass of this design (indeed it would be nearly impossible to attempt a description of the infinite variety of inventions that have been produced for these operations), I have confined myself solely to those which are at present in the actual employ, and highest in the estimation, of our most celebrated oculists. I have my doubts whether the introduction of Specula will be justified by the above assertion, as this instrument is now but very little used; indeed, in the opinion of many ingenious and distinguished operators, it is likely to occasion more harm than benefit in its application: however, as it is yet sometimes in request, I have selected a few of the least exceptionable, at least such as, when asked for, are preferred.

In the finishing of these instruments the extreme delicacy of the operation, the irritable member they engage with, and the vast importance of the event, combine to demand in a most particular manner the utmost exertion of the artist's skill. Excellence of temper, and exquisite perfection of workmanship, are indispensably requisite in the construction of the Knives for making the section of the Cornea; the most precise attention must be paid to the regularity of their surfaces, and the delicacy of their points and edges, which should pass through the eye with as little resistance as if dropped into water; at the same time a certain degree of strength is necessary, to prevent their breaking or bending when engaged with the tough hard substance of the Capsule; their sides should be slightly but very regularly convex, like those of a Lancet, and their thickness gradually increasing from the point to the part fixed into the handle, thus forming a species of wedge, by which the escape of the aqueous humour is most effectually prevented. It would ill become me to hint at any superiority in either of the different forms of these instruments; I shall therefore only mention them respectively under the name of the operator who has invented, or who may use them, leaving that decision to more perfect judgment.

FIG. 1. The Speculum delineated by Mr. Bell, consisting of a ring with a concave lip at its superior extremity, for the more perfect retention of the upper lid; the stem is furnished with a curved neck near the ring, and is fixed into a handle of ebony.

FIG. 2. A view of the same instrument, as it is sometimes formed, with an opening on one of its sides to admit the passage of the Knife: thus constructed, two are necessary,

one for each eye; but this alteration is seldom adopted, as the projection of the orbit of the eye through the ring of Fig. 1, is generally sufficient for the intended purposes of the Knife.

FIG. 3. A side view of the same instrument, representing the form and dimensions of the concave lip.

FIG. 4. An instrument invented by myself for this purpose, under the idea that its application would be easier, that it would occasion less pressure upon the orbit, and, from its admitting of a variety of dimension, that it would adapt itself to eyes of all sizes, and thus become more generally useful. Its construction consists of two separate blades (a) of oval figures, adapted to the form of the eye, concave on their external surfaces, to engage more readily with the edges of the palpebræ, and connected together by a joint at (b), their points kept close by the action of the spring (c), and expanded by the compression of the handles, which are covered with ebony.

FIG. 5. The Levator of Mr. Wathen, for the purpose of supporting the upper lid during examinations of the eyes, for which it is very ingeniously and effectively calculated; it is made of soft silver, that its form may be easily varied, is furnished at its superior extremity with a narrow concave lip, and fixed at the other into a short flat ivory handle.

FIG. 6. A side view of the same instrument, to represent the construction and dimensions of the concave lip, as well as its curvature.

FIG. 7. The Speculum of M. Pellier, formed of nealed silver wire, readily admitting any necessary variation of form. One of its curved extremities is applied immediately behind the cartilaginous border of the upper eyelid, where it is retained by an assistant, while the operator with the fingers of one hand makes the necessary pressure on the under edge of the orbit.

FIG. 8. A Speculum, of somewhat similar principles, and intended to be used in a similar manner, but different in its construction, being formed of a thin silver plate curved at one extremity, and of a temper sufficiently ductile to admit easily of variation of form; the line on its right side is intended to represent its curvature. The engraver has committed a small error by reversing the position of this line, which the reader will have the goodness to correct.

FIG. 9. A pair of Spring Forceps, adjusted and secured by a ring sliding on their

PLATE XVI

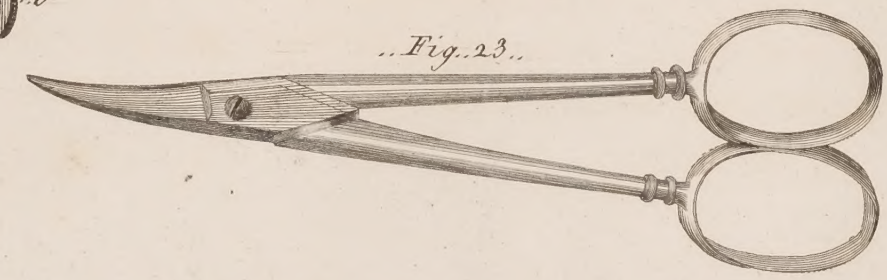
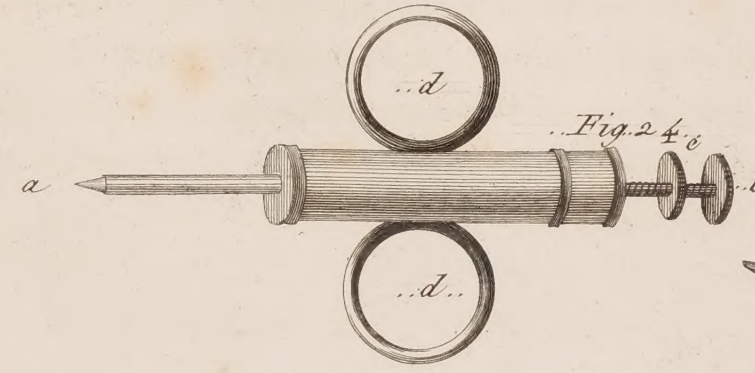
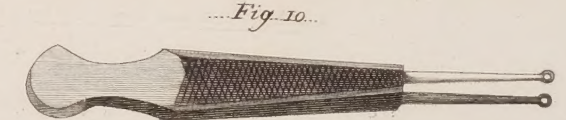
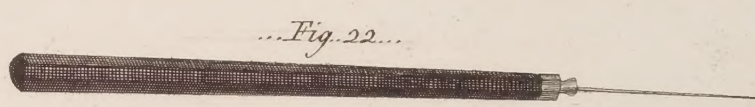
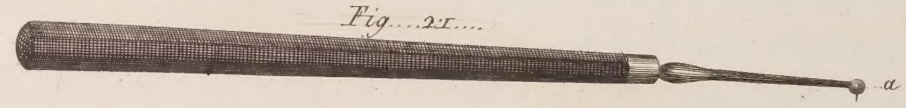
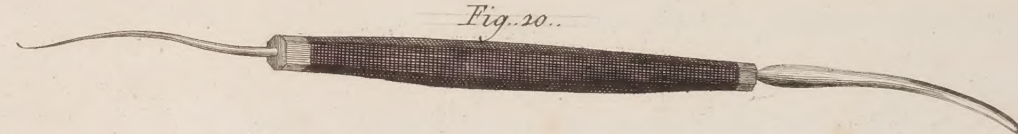
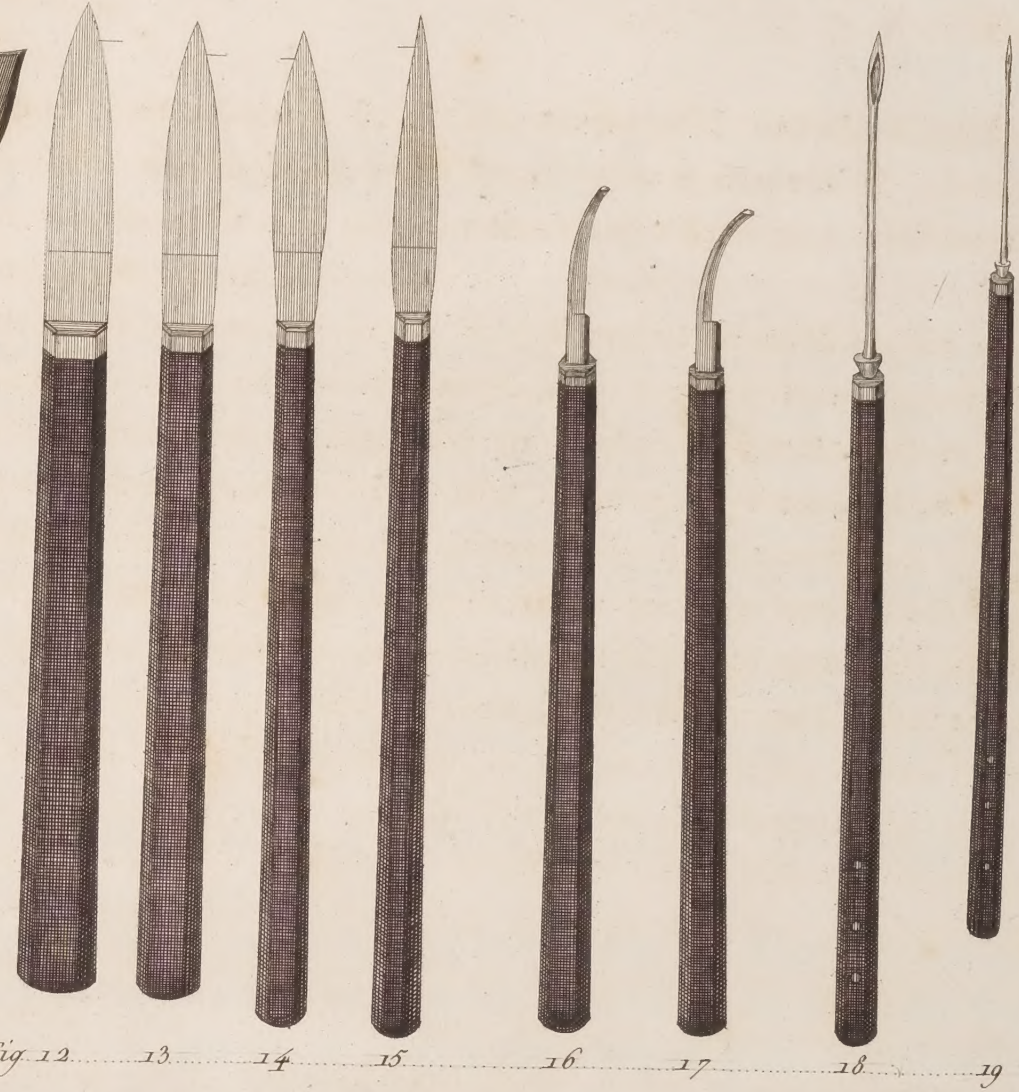
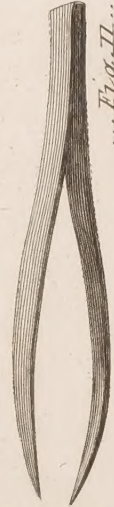
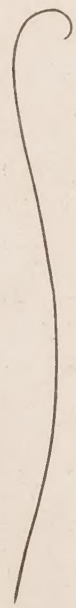
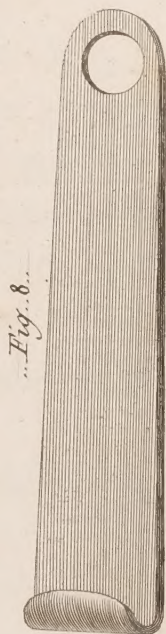
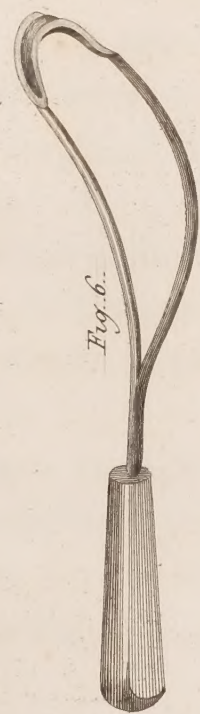
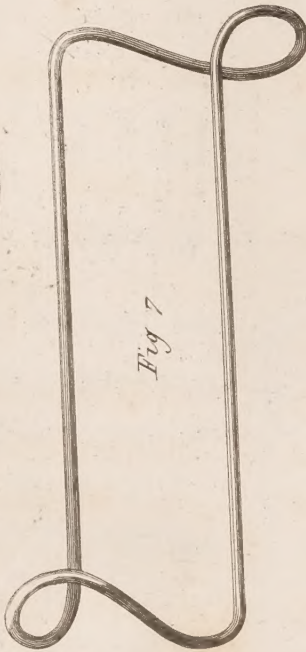
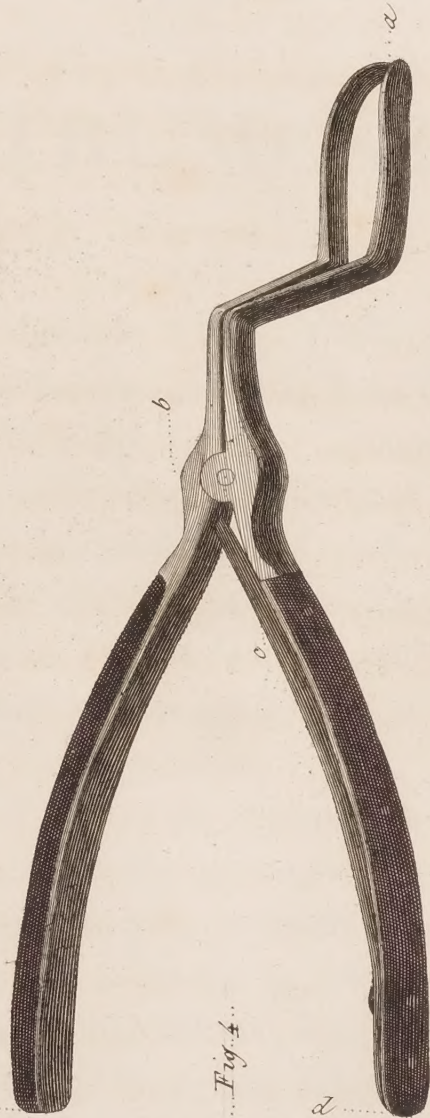
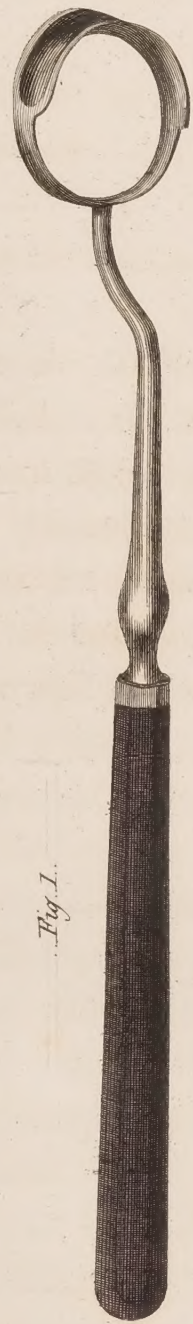


PLATE XVI.

INSTRUMENTS FOR THE FISTULA LACHRYMALIS.

FIG. 1. A silver Syringe, commonly termed Anell's, for injecting fluids through the puncta into the sac. (a) a very fine straight gold Tube screwed to the inferior extremity of the Syringe; (b) a curved Tube of the same materials and size, on some occasions more convenient than the straight one; (c) a conical end occasionally affixed to the Syringe for injecting pure water through the lead tubes, after their introduction into the duct, to ascertain precisely the propriety or otherwise of their situation.

FIG. 2. A glass Tube, with a Stop-cock, and an exquisitely fine steel Pipe, for injecting quicksilver. This is made exactly upon the same principles as those described in their proper place for injecting the lymphatics.

FIG. 3, 4, 5. The lead Tubes of Mr. Wathen to introduce into the duct, to form an artificial channel for the tears. They are represented of the different gradations of size usually found necessary, and are each furnished with a longitudinal opening on one side of their thickest extremities, and on the opposite a small hole, through which the thread passes which fixes them to the styles. These instruments should be made perfectly smooth, without the least edge or asperity whatever, and the superior extremity of the head should be, what is termed by workmen, counterbore, or rendered concave, somewhat like a funnel.

FIG. 6, 7, 8. Three silver Probes, whose bulbous ends are exactly of the same diameter as the heads of the respective Tubes; so that, by previously introducing one of these into the duct, the proper size of the Tube required may be more certainly determined.

FIG. 9. The screw Style, with one of the Tubes attached to it, representing the mode by which they are connected together by the thread.

FIG. 10. The Style separated from the Tube to shew its construction more dif-

tingly. The portion formed as a screw is furnished with a nut, which adjusts its length exactly to that of the Tube, of whatever size may be applied, and which, resting upon the head of the Tube, gives resistance to its introduction; which, when accomplished, the Style and Tube are separated by cutting the thread with a pair of scissors, withdrawing the Style, and leaving the Tube in its place; by this contrivance the necessity of a variety of Styles is superceded.

FIG. 11. A small Blunt Hook, occasionally employed for extracting the Tube from the duct, by introducing it into its superior extremity, and turning it about till it engages with one of the openings.

FIG. 12. A Scalpel, of the most proper form and size, for making an incision through the integuments into the sac.

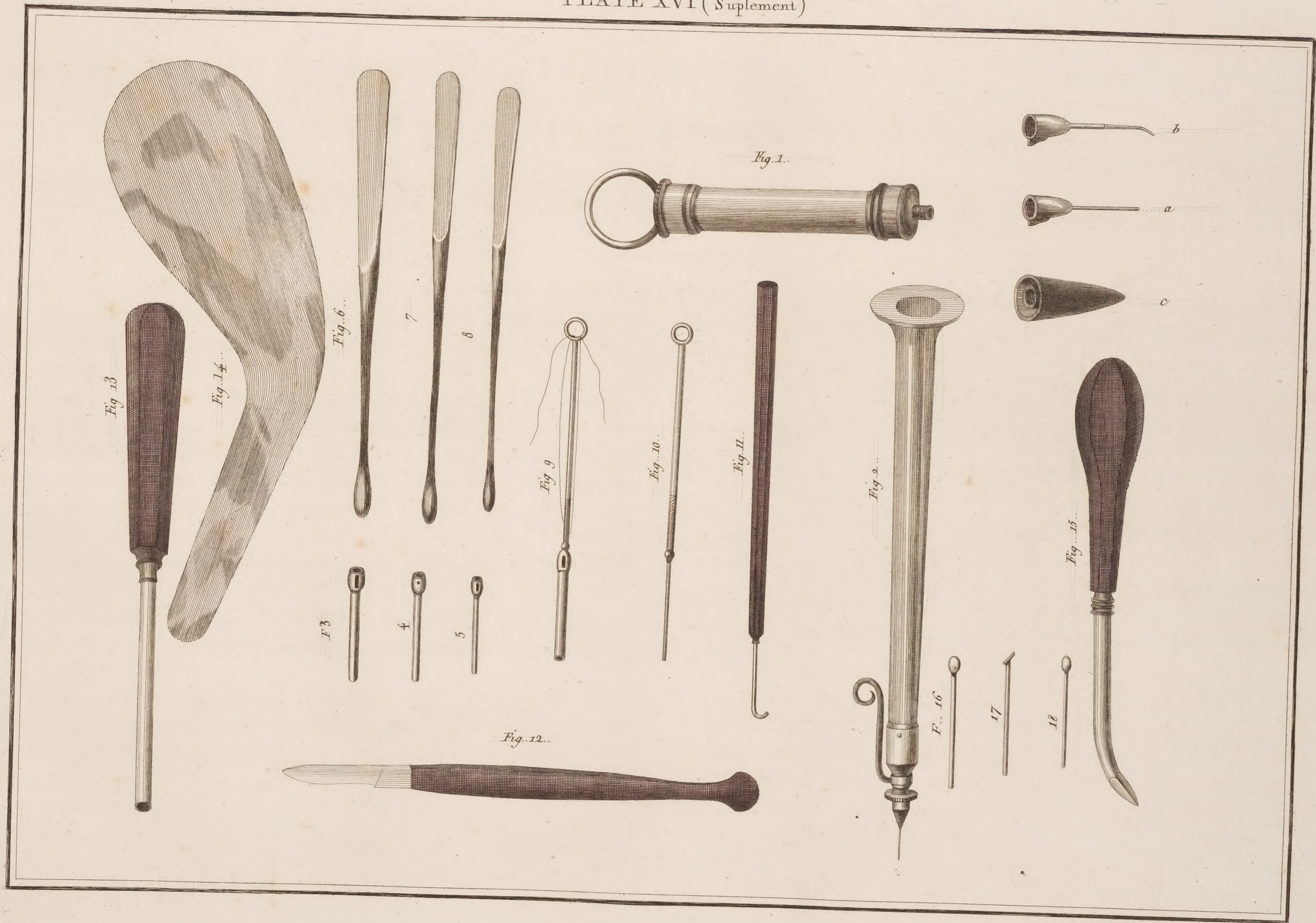
FIG. 13. An instrument for perforating the os unguis. This instrument, formed like a circular chisel, is calculated to perform the operation more delicately than in the common mode. It is intended to act upon a flat piece of horn, introduced into the opposite nostril, which, affording a resistance to its edge, enables it to cut the piece of bone clean out, without leaving any jagged fragments, which might occasion future troublesome exfoliations.

FIG. 14. The flat piece of horn alluded to in the preceding article.

FIG. 15. The Perforator formerly made use of for this operation; it is merely a common trocar, slightly curved at its point. It is obvious that the effects of this instrument must be very abrupt, and very likely to produce mischievous consequences.

FIG. 16, 17, 18. Silver Tents, of different sizes, invented and used by Mr. Ware, for introducing into the duct.

PLATE XVI (Supplement)



Hery. Sculp.

PLATE XVII.

INSTRUMENTS FOR INJECTING ANATOMICAL PREPARATIONS.

FIG. 1. A brass Syringe, of a capacity to contain eight ounces of fluid. To prevent unnecessary repetitions, I have represented this as the most generally useful size, though the series in which they are usually made, comprehend those for twelve, eight, six, four, and two ounces.

FIG. 2. A Blow-pipe, whose inferior extremity is adapted to fit into each of the injecting pipes, (a), (b), (c), (d), (e), (f), (g), (h), (i); by this the vessels are inflated, while the Stop-cock, with which each pipe is furnished, preventing the return of the air, keeps them distended till the Blow-pipe is removed, and the Syringe affixed, when the injection is thrown in with the utmost facility. The small circles at their points describe the dimensions of their respective calibres.

FIG. 3. A brass Key, adapted to the different squares at either end of the Syringe, to screw them on and off.

FIG. 4. A glass Tube for injecting the lymphatic vessels with quicksilver, furnished at its extremity with a steel pipe of exquisite delicacy, and an improved stop, much more

simple in its construction, and convenient in its use, than the common cock hitherto made, and less liable to be choked up or injured; the wire extending from it gives its action, which is confined to one half of the diameter of the Tube; when it stops at the small pin on the steel mounting the pipe is open, and when at the opposite point it is shut. (a. b.) two fine steel pipes to screw upon the steel mounting at the extremity of the tube, one curved, and one straight: these have usually been furnished with a cross bar of steel (as here represented) for the purpose of attaching the vessel while the quicksilver flowed into it; but the construction of the shoulders with milled edges answering the purpose equally well, and having a much neater appearance, they have been discontinued; (c) a very fine steel wire to pass through and cleanse the pipes.

FIG. 5. A small brass Syringe for injecting very minute preparations; (a) a fine pipe of brass adapted to a small projecting end, screwed into the inferior extremity of the Syringe; (b) a small Stop-cock, occasionally preferred; (c) a small brass pipe adapted to plug on it.

Fig. 2.

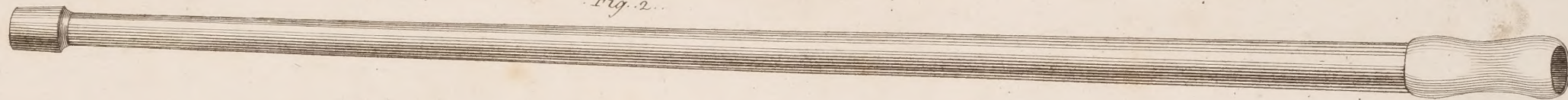
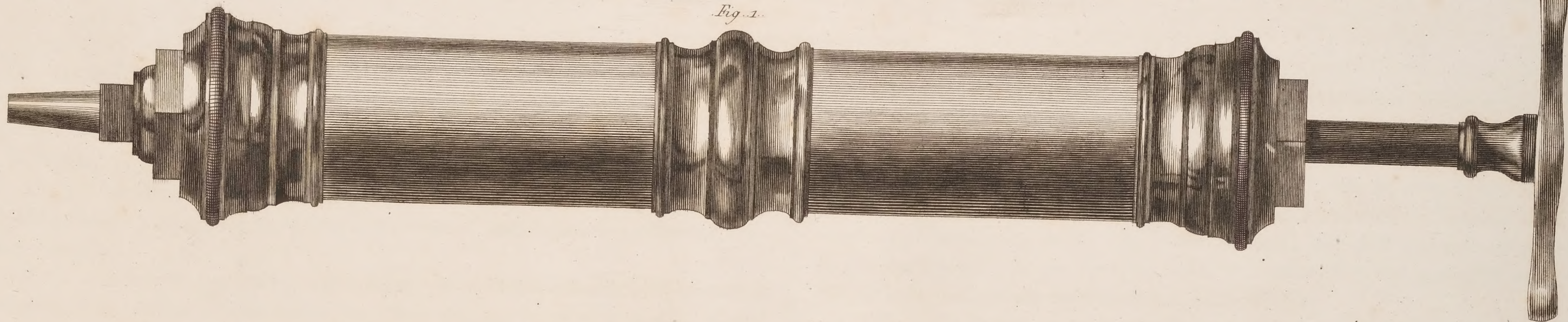
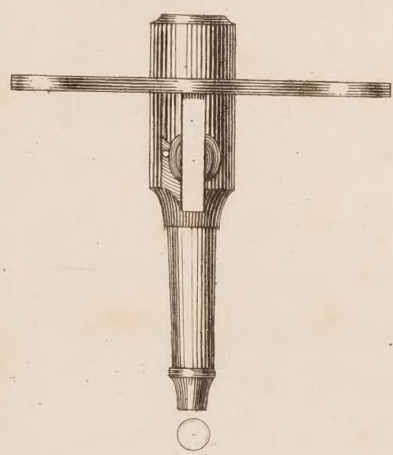


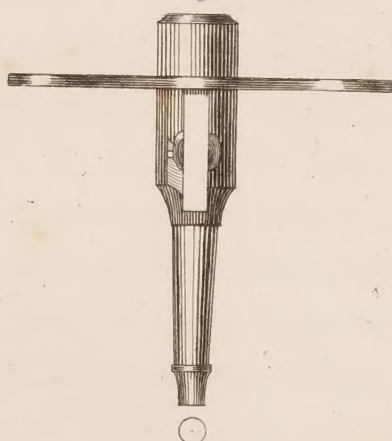
Fig. 1.



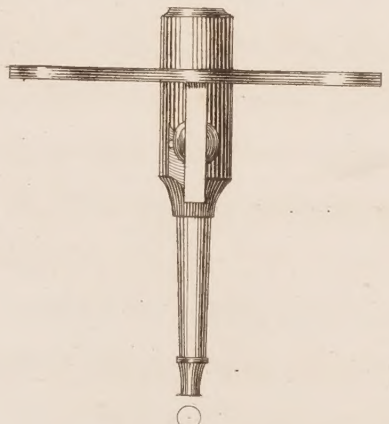
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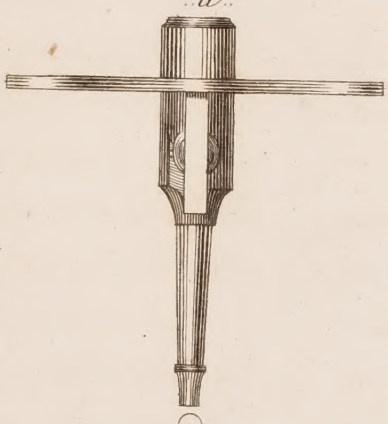
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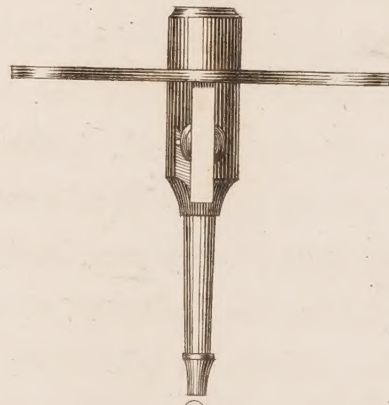
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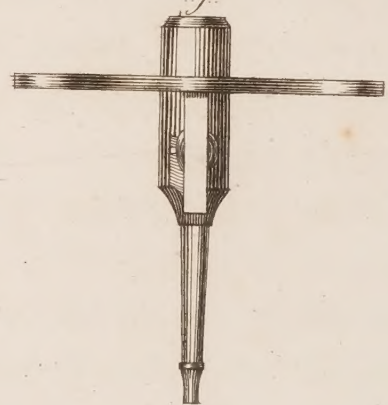
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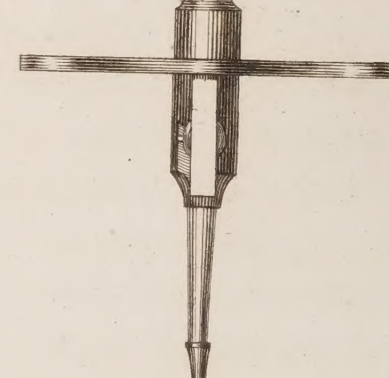
e.



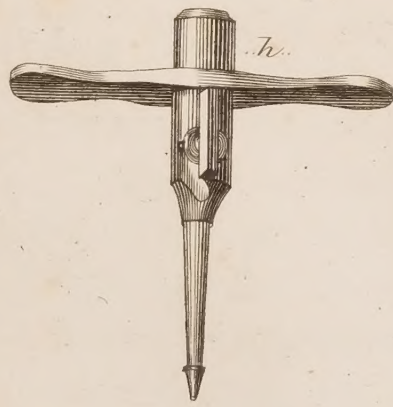
f.



g.



h.



i.

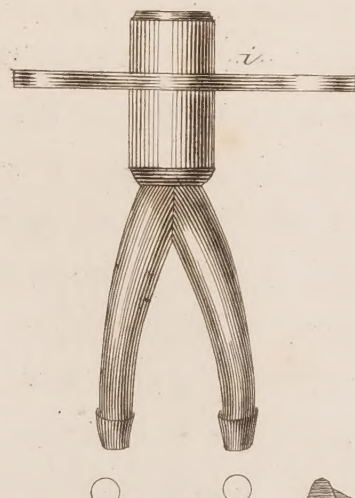


Fig. 5.



Fig. 3.

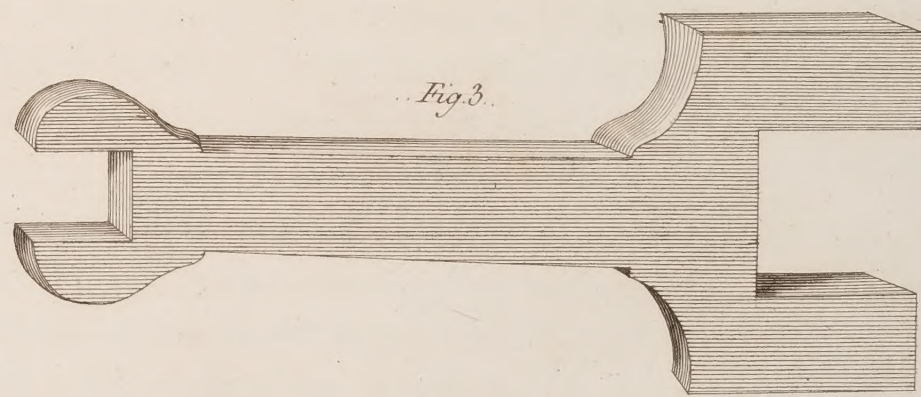


Fig. 4.

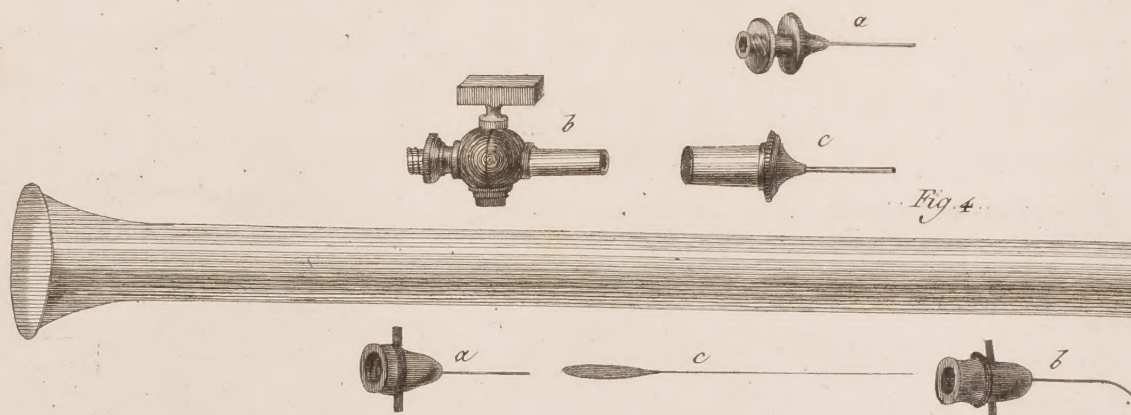


PLATE XVIII.

ELASTIC BOTTLES.

WE now come to a description of the various purposes to which are applied these singularly useful machines. It is not my intention, nor does it fall within my ability, to enter into the natural history of this wonderful production; I shall only say, that, in respect to its mechanical properties, surgery has received very few more important acquisitions. We are now to treat of them as Syringes in all their varied forms, as suited to different purposes, and for which, from their simplicity of action, and facility of application, they stand unrivalled.

FIG. 1 represents the smallest extremity of one of these machines, of a capacity to contain a pint, mounted with a socket and stop-cock, for the purpose of administering enemata; (a) the socket with its superior surface turned concave, or somewhat resembling a funnel, that the fluid may be more easily poured into it; (b) the stop-cock separate. The intention of this appendage is to prevent the reabsorption of the fluid into the bottle, should not the whole contents be completely injected by the first pressure; in this case the stop-cock is to be shut, by placing it in a transverse direction with the neck of the bottle, till the hand has recovered its power; it is then to be returned to its longitudinal position, and the remainder of the contents discharged; (c. d.) two ivory pipes of different dimensions, to affix to the end of the stop-cock, and to be introduced into the rectum.

FIG. 2. A curved Pewter-pipe (termed a Self-pipe) mounted on a square piece of wood, by the assistance of which a patient may, with the most perfect ease, perform this operation himself; (a) the end to receive the ivory pipe for the rectum, (b) *that* into which the extremity of the stop-cock is inserted: thus arranged, and placed upon a chair or stool, he has only to seat himself gently upon the ivory pipe, while the pressure of his hands upon the bottle discharges the fluid in its desired direction.

As oils or salts have a tendency to affect and destroy this truly useful substance, the utmost care is necessary to cleanse the bottle well after using it with any fluid, of which either of the above ingredients compose a part; for this purpose it should be well rinsed with lukewarm water, set upright, with the socket (without the stop-cock) downwards to drain, and afterwards well inflated, and the air confined by shutting up the replaced stop-cock. An attention to these plain instructions would preserve these valuable instruments a great length of time.

FIG. 3. A bottle, to contain about four ounces, mounted with an ivory socket,

pipe, and shell, for injecting the vagina and uterus; (a) the socket; (b) the pipe, with the shell (c). This is a most useful addition to the instrument, furnishing a resisting point, and assisting the necessary pressure of the hand.

FIG. 4. A Bottle, of about two ounces capacity, with an ivory socket, and long pipe, for injections of various descriptions; in this the pipe is inverted, which, when covered with the cap (c), renders the whole compact, and most conveniently portable; (a) the pipe separate; (b) the screw by which it is attached to the socket for use; (d) a second screw, fixing it also into the socket when inverted.

FIG. 5. A Bottle, of nearly the same dimensions, with a short obtuse pipe, for injections into the urethra.

FIG. 6. A Socket, adapted to a bottle of the same size, with a pipe for the same purpose, but differently formed, having a small bulb at its extremity: this is preferred by many, though the former is most generally adopted; both these are covered by the cap (c).

FIG. 7. An elastic Bottle mounted with a glass, of a convenient form for drawing women's nipples, one of the most important and useful purposes to which these machines are employed; (a) the diameter of the mouth of the glass. A very common error, arising from the ignorance of nurses, attends the use of this instrument, and frequently brings it into unmerited disrepute; instead of exhausting the internal air by pressure previous to its application, they present it to the breast in its distended state, and imagine that their subsequent pressure is to produce the desired effect. I will not so far insult the understanding of my medical readers, as to point out to *them* the fallacy of this principle, I have merely mentioned it, that when it thus happens under their immediate inspection, they may themselves explain the causes of the insufficiency, or that their recommendations of the use of the instrument may be accompanied with suitable instructions to prevent its failure.

FIG. 8. Though this machine does not come strictly within the class of those of which I have been treating, yet as its properties are directed to the same purposes as the last, I thought it could not be considered as improperly intruded.

It represents a glass of a late construction, receiving a considerable increased power from the action of an exhausting Syringe, and of a shape most conveniently adapted to form the nipple without pain, at the same time that it extracts the milk; while the socket

which carries the valve, and which receives the end (a) of the Syringe, Fig. 9, being fixed into an inverted neck in the superior surface of the glass, reduces its volume in this part so essentially, that it may occasionally be worn for some little time beneath the stays without inconvenience; should it any time become too strongly and painfully attached to the breast, one revolution of the screw of the valve, which fixes it to the bottom of the socket, by admitting the air through a small hole left for this purpose in its body, instantly disengages it. The better to accomplish this, and that it may be more readily engaged between the fingers, the valve projects slightly above the surface of the glass, as seen at (b).

FIG. 9. An exhausting Syringe adapted to the glass above described, made exactly upon the same principles as that for cupping, except that it is furnished at its inferior extremity with a hollow *male* screw, to fix *in*, instead of *upon*, the mounting of the glass, and of a capacity sufficient to cover the valve.

FIG. 10. A Bird's-eye view of the superior surface of the glass, to shew more accurately the construction of the valve (a), and the insertion of that and its socket into the inverted neck; (b) the diameter of the socket, (c) that of the mouth of the glass.

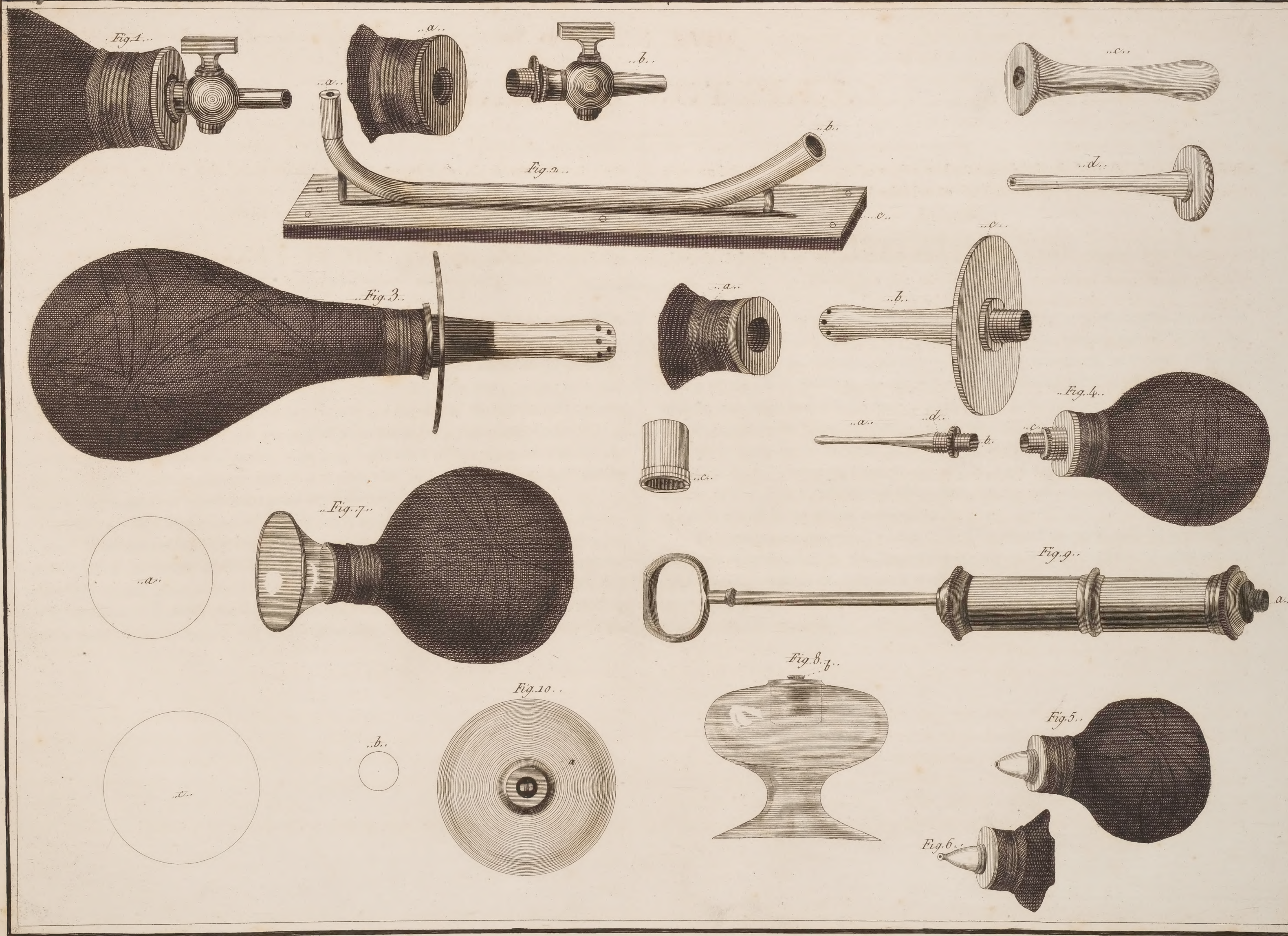


PLATE XIX.

THE BELLOWS FUMIGATOR, AND INSTRUMENTS FOR INFLATING THE LUNGS.

FIG. 1 represents the machine constructed for conveying the fumes of tobacco or other herbs into the intestines; all its parts are here completely connected for use, and it is shewn upon a very exact scale of half its accustomed size. (a) the nozzle of the bellows, with a grating at its extremity to prevent the ashes of the herbs from passing into and injuring them: this is attached to the box by the pin on its side sliding into the groove in the neck of the cover, in the manner of a bayonet; (c) a brass box enclosed in a wooden cover to contain the herbs; (d) a long brass neck issuing from its inferior extremity, and connected with one end of a flexible tube of leather of about three feet in length, to the other of which is attached an ivory pipe for the rectum (e).

FIG. 2. An instrument for inflating the lungs, also of exactly half its usual dimensions. It consists of a flexible tube, furnished at one end (a) with a brass mounting, to receive either the nozzle of the bellows, or the small extremity of the wooden mouth-piece (b), should atmospheric air, or the breath of a healthy person be employed; and at (c) another, into which may be screwed the short flat ivory pipe (d), adapted to fill up one nostril, or the extremity (a) of the silver tube, Fig. 4, of its full and proper size,

and of a convenient curve (similar to that of a male catheter) to pass beyond the glottis.

FIG. 3. A silver Tube, for the same purpose as the former, but differently constructed, and supposed superior, as it may be as easily introduced, and admits a larger volume of air. It is round at the extremity next the screw, and becomes gradually oval towards the point, which is perfectly obtuse and smooth, and has two lateral openings near its extremity, to admit the passage of the air. This is also of its full and proper size, and may be attached by its screw (a) to the flexible tube, Fig. 2.

FIG. 5, 6. Two ivory Pipes for the rectum, to be attached to one extremity of the flexible tube of Fig. 1, of different dimensions, as the different ages of the subjects on whom they may be employed may require.

The instruments delineated in this Plate comprehend the most essential parts of the apparatus recommended by the *Royal Humane Society* for the purposes of resuscitation; the remaining contents of their chest consisting of bottles and boxes for containing tobacco, salt, spirits, essential oils, &c. with compartments for cloths, flannels, and whatever else may be required.

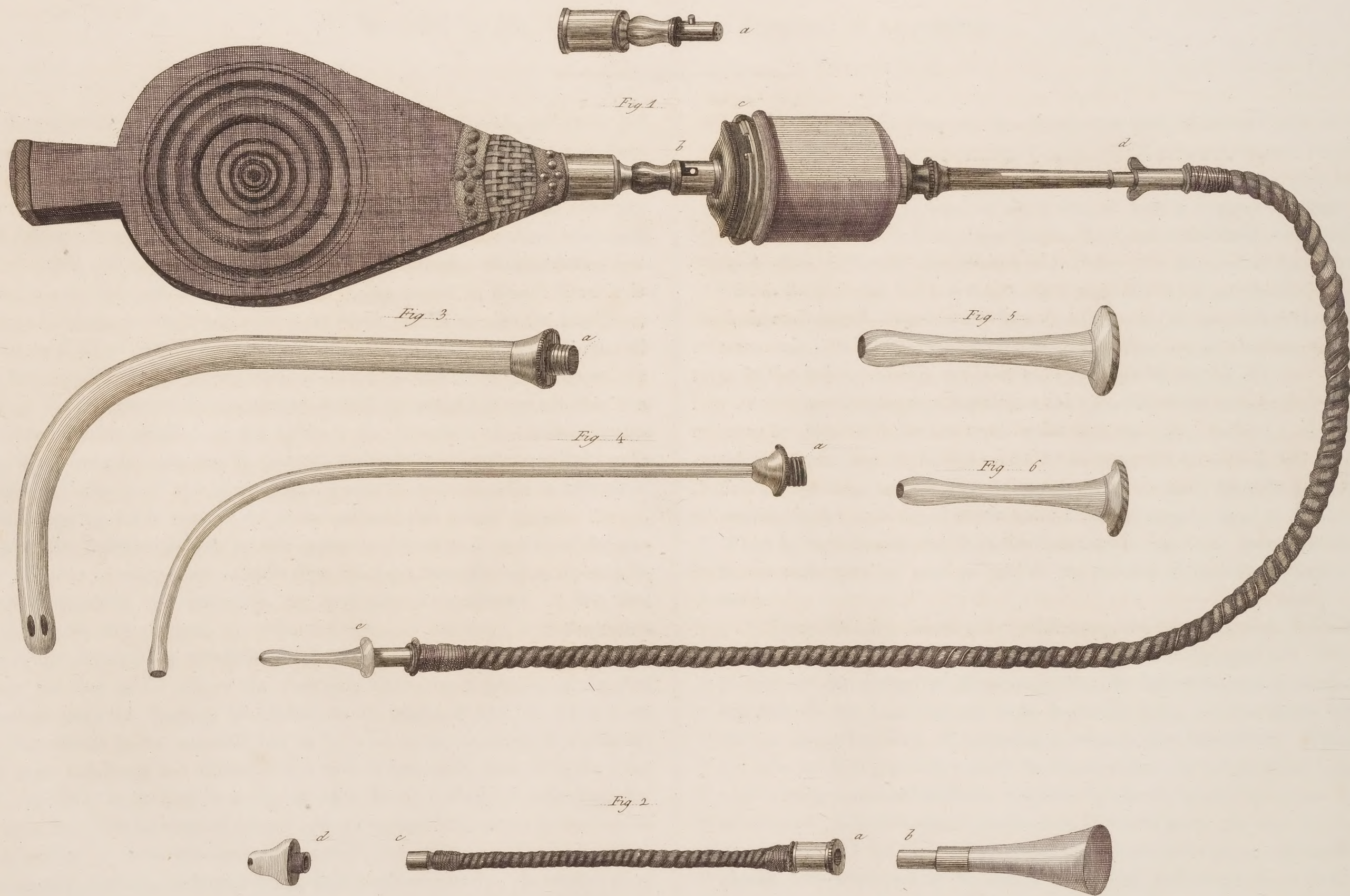


PLATE XX.

THE PORTABLE APPARATUS FOR RESTORING SUSPENDED ANIMATION,

Invented by MR. CHARLES KITE, Surgeon, of Gravesend.

THOUGH the apparatus of the Royal Humane Society, described in the last Plate, possesses every requisite for the accomplishment of its purposes, it is necessarily upon so large a scale as to become objectionable upon the score of convenient portability, and is better adapted for a constant appendage to a receiving house, or to be deposited near some probable scene of danger, than to be resorted to upon instantaneous exigencies, when accidents happen in distant and unexpected situations, and the difficulty of immediately conveying so bulky a case may occasion a delay fatal to the object in view. These considerations induced the gentleman above named (to whom the Public and the Society are indebted for the most active exertions in the promotion of their truly philanthropic designs) to turn his thoughts to the arrangement of all its essential parts in a compass sufficiently small for the pocket, and he has succeeded most completely in the selection here represented; where, by the omission of the bellows, the invention of a hollow conical screw, by which any common pair may be instantly connected whenever required, and a judicious division and disposal of the other various parts, he has composed a most effective collection, occupying not so much room in the pocket as an octavo volume.

In describing the component parts of this apparatus I shall avail myself of the permission of the inventor to make some extracts from his ingenious essay upon the subject, in which their construction and intentions are most ably demonstrated. “ We have endeavoured to shew, that restoring the suspended action of the lungs is of the utmost importance in our attempts to recover the apparently dead, let the original cause be what it may; but that in the case of the drowned, where the suspension of the vital powers proceeds from the stoppage of respiration, we ought, if possible, to be more particularly expeditious in its removal: but as it is an operation which is usually attended with great indelicacy and difficulty, and as it is frequently, at least in the common mode, impossible to perform it at all, we have strong reasons for suspecting that many lives have been lost for want of proper and convenient instruments to accomplish it. After a variety of inventions and experiments, the instrument here delineated, Fig. 1, has, in every instance, answered the purpose most completely. It consists of an elastic tube of red leather, about twelve inches in length, to one end (b) is fixed an

“ ivory or silver mouth-piece (a), or any common pair of bellows may be adjusted to it
“ by means of the hollow screw, Fig. 8, (its conical extremity forced into the nozzle by
“ the assistance of the winch, Fig. 9, adapted to the square upon its other extremity) and
“ to the other end an addition of ivory also, of such a form as to enter and fill up a
“ nostril. It is thus used: a proper person, stationed at the head of the body to be operated upon, passes the appropriated end of this tube into one of its nostrils; and, sustaining it there with his fore finger, he compresses both nostrils so firmly between the thumb and middle finger of the same hand, that no air can pass otherwise than by the tube; and with the other hand applying the other end of the tube to his mouth, he blows with force through the pipe into the nostril of the subject.

“ The medical director, standing at the right side of his charge, must keep the mouth perfectly closed with his left hand, while with his right, making a suitable pressure on the prominent part of the wind-pipe, he prevents the air passing into the stomach; till, finding the lungs are properly distended, he is to press strongly upon the chest, removing at the same time his left hand from the mouth, so as to let the air pass out. When by these means the lungs are compressed, the same process is immediately to be repeated; that, as near as can be, the manner of natural respiration may be imitated.

“ If any difficulty should arise in distending the lungs, it must proceed either from water in the wind-pipe, or a contraction or adhesion of the epiglottis. We have already pointed out the method of discovering when the first circumstance occurs; and, if my experiments and reasoning are to be depended upon, we have shewn the inutility, as well as impracticability, of removing it when it does take place. When the latter is the case, we shall generally remedy the inconvenience by bringing the tongue forwards; which, being connected with the epiglottis by almost inelastic ligaments, must of course be elevated. Should further impediments, however, occur, the pipe for the nostril is to be removed, and the silver tube, curved like a male catheter, recommended by Doctor Monro, and mentioned by M. Portal, M. Le Cat, and others, is to be screwed on the tube in its place; this is to be introduced through the mouth, or one nostril, into the

“ glottis; when, on blowing through the mouth-piece, or applying the bellows, the lungs
“ will be dilated.

“ This last instrument is likewise much better adapted for inflating the lungs, when
“ in such cases trachæotomy is performed, than the common dissecting blow-pipe, the
“ implement generally had recourse to.

“ The introduction of stimuli into the stomach is deservedly reckoned a material
“ part of the process: these may be most conveniently exhibited by means of the elastic
“ tube, Fig. 3, furnished at one end (a) with the mouth-piece, acting in this instance as
“ a funnel, and at the other (b) with a bulbous mounting of ivory. Should any ob-
“ struction occur to the entry of the medicine, it will be overcome by applying the mouth
“ to the funnel, and blowing upon the liquid, which will then pass into the stomach.

“ If my objections against the use of the fumes of tobacco are founded upon just
“ principles, the apparatus in common use for that purpose will of course become unne-
“ cessary; a large bladder, Fig. 4, fastened to a small ivory tube (a), which may instantly
“ be connected to a proper pipe, Fig. 5 or 6, will be sufficient therefore for this purpose;
“ and a clyster may immediately be formed by mixing some of the vegetable essence with
“ a large quantity of warm water.

“ But, even admitting I may be in error, and that the fumes either of this or any
“ other vegetable may be of greater service than a diluted solution of their essential oils,
“ still I do not see the least occasion for a case so large and cumbersome; if the bowl
“ which contains the fumigating substance be sufficiently large to contain fuel for a very
“ few minutes, it is surely competent to our purpose; for nothing can be more absurd
“ than the idea of keeping the bowels in a state of most violent distension for two or

“ three hours without any intermission. If, therefore, it be judged necessary, a brass fu-
“ migator, Fig. 7, of such a size, is occasionally added without materially increasing the
“ bulk of the case, and this may be connected to any *common pair of bellows* by the
“ medium of the conical screw between (b) and the nozzle, or may be worked by the
“ mouth-piece (a), attached to the same place to take up less space; the extremities (a)
“ and (b) screw off from the main barrel, and are commodiously lodged in separate com-
“ partments in the case; (d) a cover to one end of the fumigator, into which the to-
“ bacco, &c. is inserted when mounted for use; the extremity (a) is screwed into the end
“ (a) of the blue flexible tube, Fig. 2, and to the other is attached one of the ivory pipes,
“ Fig. 5, or 6; it is then complete, as seen in Fig. 4, of the sketch in the lower part of
“ the Plate.

“ Proper vials to contain essence of any aromatic vegetables, as camomile or pepper-
“ mint, and the volatile alkali, and likewise emetics and stimulating powders, are con-
“ tained in different compartments of the case.

“ The degree of vital or natural heat remaining in the body, and the degree of arti-
“ ficial heat which is proper to be applied, cannot be ascertained or regulated with suffi-
“ cient precision without the assistance of a thermometer; one constructed upon Mr.
“ Hunter's principles, Fig. 10, is therefore provided in the case for these purposes.”

FIG. 1 in the sketch represents the inflator connected for use, to be applied to the nostril.

FIG. 2. The same instrument, with the curved silver tube for the trachæa.

FIG. 3. The black flexible tube, mounted with the mouth-piece for injecting fluids into the stomach.

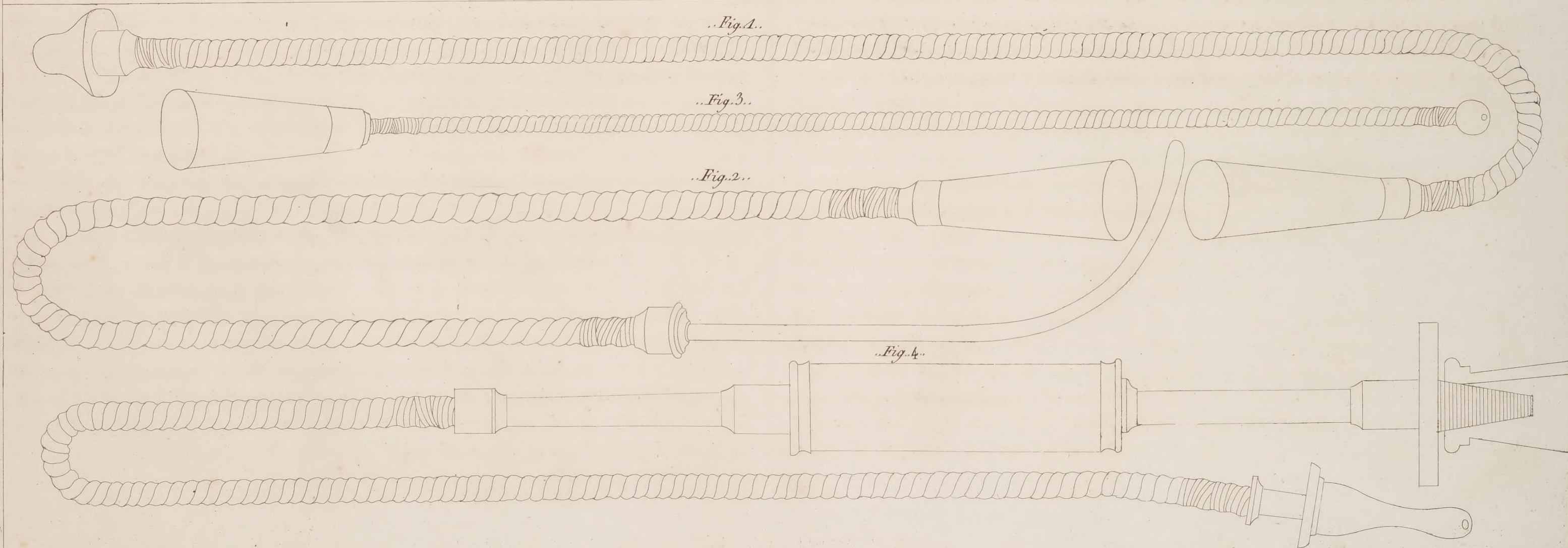
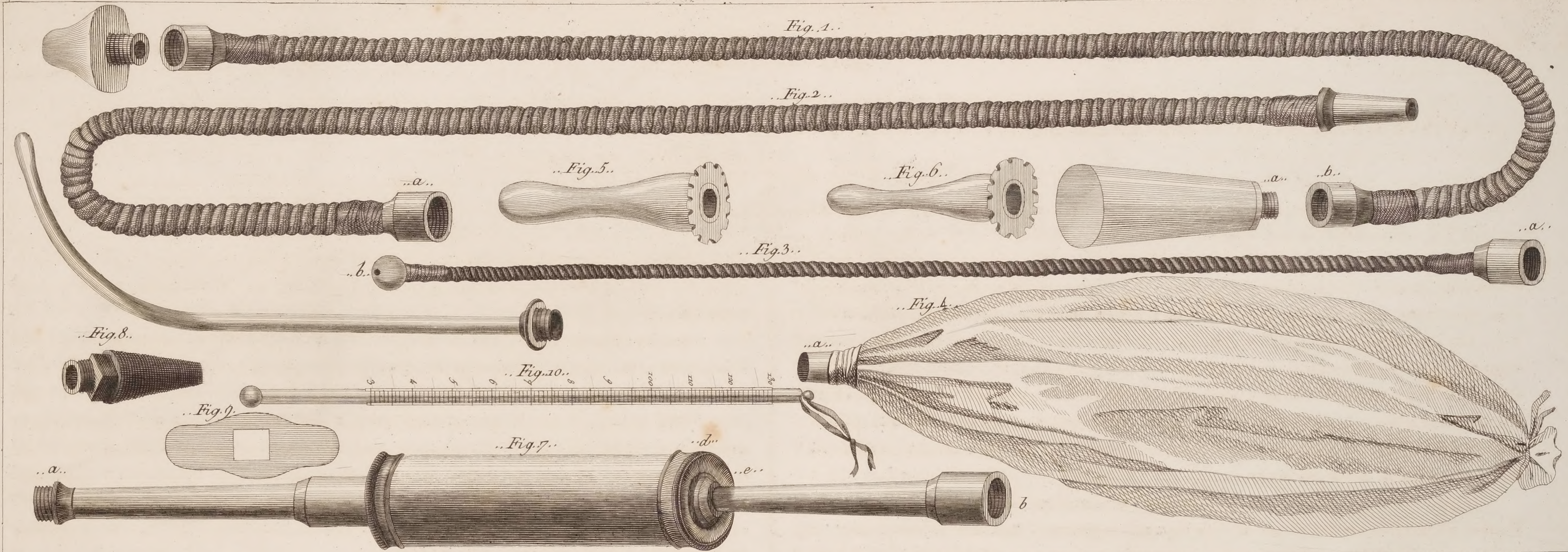


PLATE XXI.

PORTABLE AMPUTATING AND TREPANNING INSTRUMENTS.

THE unavoidable bulk of the complete sets of instruments for these operations, rendering them inconvenient for carriage to gentlemen practising in the country, who are often called to distant accidents without its being ascertained whether the injury is sustained in the head or limbs; and still more so to those engaged in the military departments of the profession, to whom conciseness in every part of their equipage is of peculiar importance; it has been suggested that, by dividing the instruments from their handles, confining their number to those only actually necessary, and disposing them in the most compact compass, the size of the case might be so essentially reduced as to be conveniently carried in the pocket. Such an arrangement has been made; and as they have been proved extensively useful, I have assigned a Plate for the express purpose of representing its contents, and of explaining the mode of connecting them for their respective uses.

FIG. 1. A capital Saw, which, though contracted in its dimensions, is still large enough for its intended purposes; the square projection at its extremity (a), is designed to be inserted into the end (b) of either of the handles, Fig. 2, in which it is firmly secured by the long screw (a).

FIG. 2. Two handles, adapted to receive the various instruments, as they may be wanted.

FIG. 3. An Amputating Knife, of a size adequate to any occasion, to be connected and secured to one of the handles in the same manner as the saw.

FIG. 4. A Metacarpal Saw.

FIG. 5. A Trephine upon the same construction as has been already described in Plate 3; the square at its superior extremity is calculated to pass into the opening in the centre of the upper handle, to which it is secured by the screw (a).

FIG. 6. A Knife, constructed to answer the double purposes of a Catlin in ampu-

tation, and a Scalpel in trepanning; (a) the steel projection beyond the extremity of the ebony covering of its handle, acting as a scraper in the latter operation.

FIG. 7. A pair of Spring Forceps, for removing the circular piece of bone cut by the Trephine.

FIG. 8. An Elevator.

FIG. 9. A Tenaculum.

FIG. 10. A pair of Spring Forceps, with a slide for securing the artery.

FIG. 11. An instrument of steel, whose two extremities are formed into scoops of different capacities, furnished internally with small teeth pointing backwards, for the purpose of extracting balls in cases where the difficulty or impossibility of following the course of the ball with other instruments renders it preferable to cut upon it, and expose it to the reach of this.

FIG. 12. A steel Probe for searching gun-shot wounds, divided by a screw in its centre, adapting it to the dimensions of the case, but when united of a sufficient length for the accomplishment of its intention.

The instruments thus described, with the addition of six crooked needles, compose the whole of this compact and portable set; which, except a tourniquet, whose bulk prevents its admission, comprises every thing necessary for two important operations.

FIG. 13. A pair of Forceps for extracting balls, ordinarily called Bullet Forceps. The points of this instrument should be formed as flat as possible on their external surfaces, and as may be consistent with their internal concavities; which, like the scoop, are furnished with small teeth pointing backwards towards the joint. Though this instrument is represented here, it does not form any part of the set of which we have been treating; the scoop, Fig. 11, requiring less space, and being generally preferred, is adopted as a more eligible substitute.

Fig. 1.

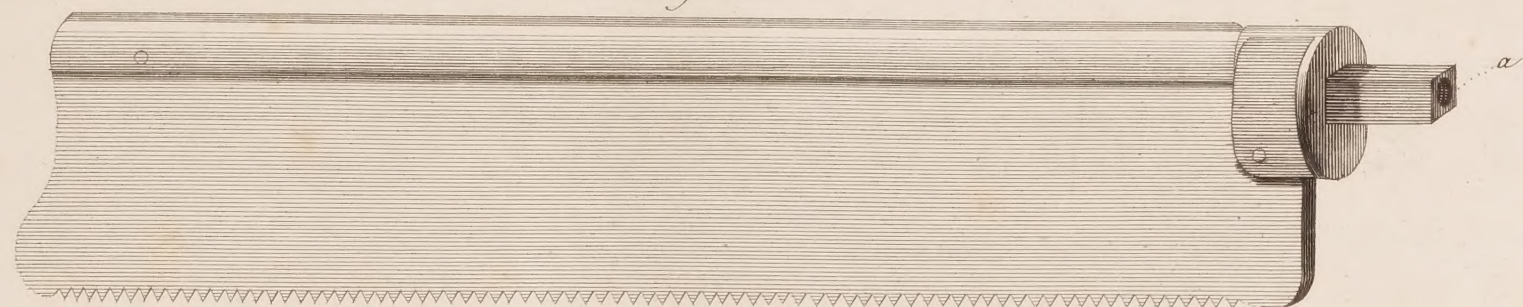


Fig. 2.

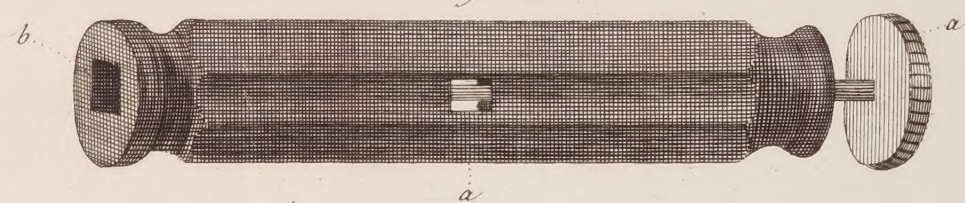


Fig. 9.

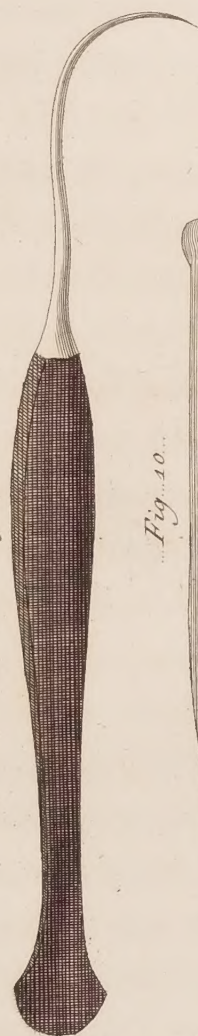


Fig. 10.

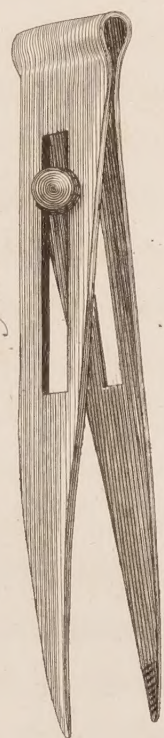


Fig. 4.

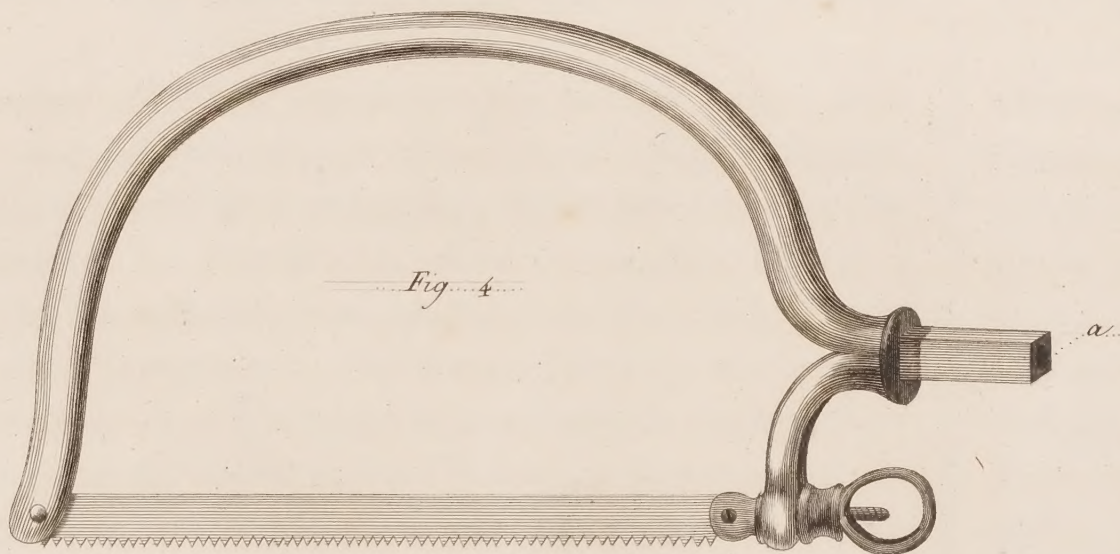


Fig. 3.



Fig. 6.



Fig. 11.



Fig. 13.

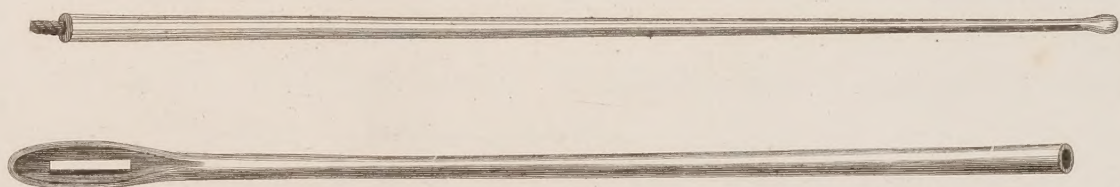
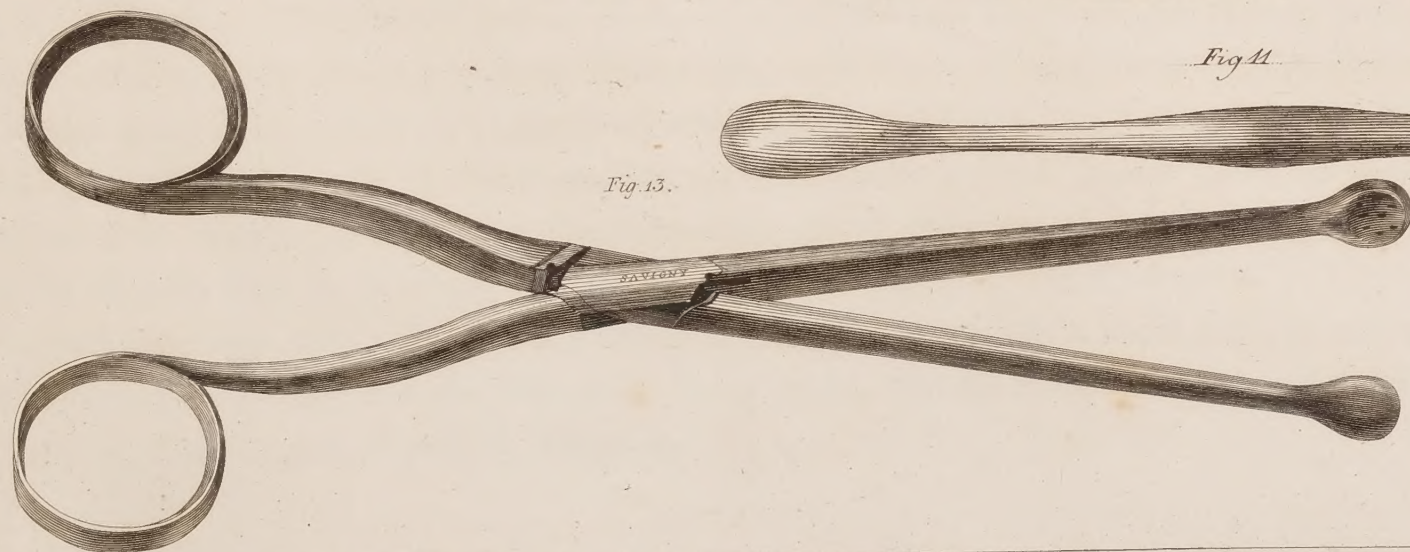


Fig. 12.

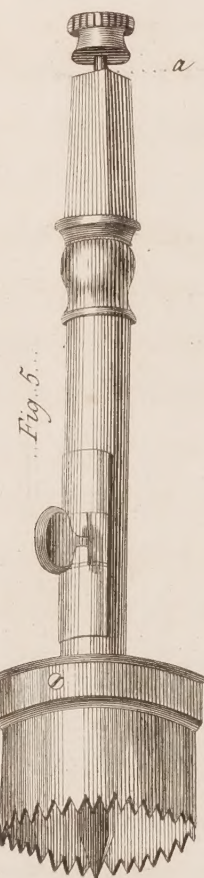


Fig. 5.

Fig. 7.

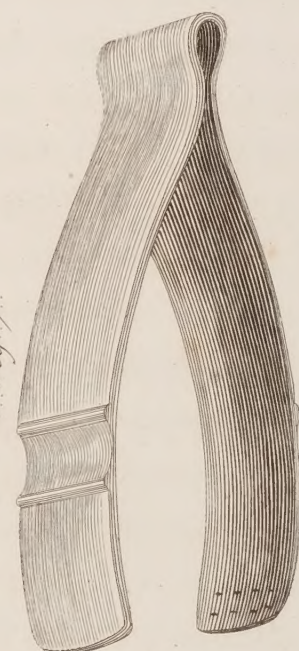


Fig. 2.

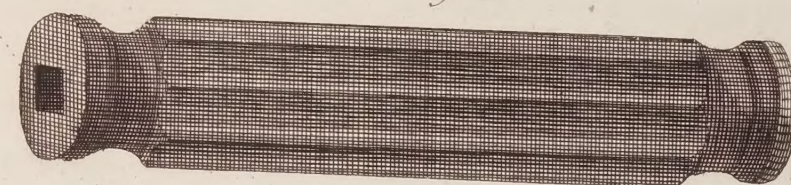


Fig. 8.

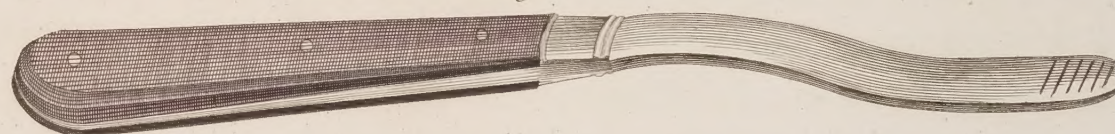


PLATE XXII.

MISCELLANEOUS INSTRUMENTS.

HAVING gone through the various collections usually classed in sets, we now come to the more general assemblage; which, from their unconnected purposes, are properly termed miscellaneous.

FIG. 1, 2, 3, 4, 5, 6, Crooked Needles, comprehending all the various sizes required in practice, and of the most approved degree of curvature. This instrument has long been distinguished for an inferiority of workmanship, which never ought to be met with in any implement of surgery; but it will cease to excite surprise, when it is reflected, that the very low price it has uniformly been rendered at, has prevented the possibility of producing a more finished performance. The liberality which it has been my good fortune to experience, has enabled me most completely to remedy the imperfection; and I take a small degree of pride to myself in having first rescued a very necessary instrument from the charge of barbarism, and rendered its use more satisfactory to the practitioner, and far less painful to the patient. It is now formed of well tempered steel, with highly polished convex surfaces, and a point nearly as perfect as that of a lancet; keen edges are not insisted on, and, indeed, might be dangerous, as having a tendency to cut through the vessels they are intended to secure. Care should be taken in the formation of this instrument, that the broadest part of its flat portion near the point is wide enough to form an opening through which its thickest part, the eye, when armed with a ligature, may pass without resistance: to render this less bulky, a regular groove should be formed on each surface in the longitudinal direction of the eye, in which the ligature lodging, adds very little to its original dimensions.

FIG. 7, 8. Two straight Needles, formed exactly upon the same principles as the former.

FIG. 9. A Needle for passing setons, of the form and size most generally in request. As this is an instrument peculiarly defenceless, and, from its construction, liable both to receive and impart injury, it is provided with a case composed of two scales of tortoise-shell, in one of which, at (a), is fixed upon a moveable rivet a small square piece of metal, adapted to the size and figure of the transverse eye of the needle; which, lodging upon it, is securely shut up between the scales. This instrument is slightly curved, its internal surface furnished with a small ridge along its centre, technically termed a bevil, and its external one regularly convex, somewhat like a lancet, that its point and edges may receive their requisite degree of perfect sharpness.

FIG. 10. A Needle for the same purposes, and formed upon similar principles, but of larger dimensions; its curve described by the dotted line at its left side.

FIG. 11. A Needle for conveying setons through large tumours, furnished with a silver canula to defend the internal parts from being injured by its point, or by the friction of the cotton. As I have varied the construction of this instrument from that heretofore in use, it becomes necessary to explain it more fully. The former instrument having only a simple canula, it struck me, that, when the point of the needle was withdrawn into it, after having first introduced it into the tumour, it presented so abrupt an end in its passage through, as to threaten more serious mischief to whatever might obstruct its progress, than could be apprehended from the point of the needle itself: hence I conceived, that if it could be so constructed as to remedy this inconvenience, and, after the point had conducted the canula into the tumour, it could be concealed by a smooth, round, and well-finished end, it would accomplish a most desirable object; I accordingly invented the instrument now under consideration, the further description of which, I presume to hope, will convince that it is perfectly well calculated to effect the desired purpose. (a) represents the canula, which appears not to terminate abruptly at its inferior extremity, but its semidiameter rendered solid, is continued about an inch and half beyond; (b) the needle itself, so constructed that when passed through the canula (introduced eye foremost at its divided extremity) its point exactly supplies the deficiency; (c) shews the point of the needle, projecting about half its length beyond the extremity of the canula, for the purpose of its first introduction into the tumour: this done, the needle is drawn back into the canula, as seen at (d), when it is perfectly defended by the obtuse end of the canula, and becomes, as it were, one solid instrument, with a smooth round point, free from the least asperity, and may be pushed forward altogether to the opposite extremity of the tumour without the smallest possibility of danger; when the point again advanced, draws the cotton after it through the canula, which is to be withdrawn in a contrary direction, thus depositing the seton safely in the tumour.

FIG. 12. A common Seton Needle, of much smaller dimensions, calculated to apply to more contracted purposes.

FIG. 13. A steel Needle, with a flat handle, and an eye at the point, which is obtuse and smoothly polished. This instrument is particularly useful for passing a ligature under the artery in case of aneurism.

FIG. 14. A common Tenaculum, in an ebony handle, for taking up arteries or large vessels in capital operations.

FIG. 15. An instrument for the same purpose, but furnished with a small flat steel handle to screw to it occasionally, and thus divided, that it may be more conveniently carried in the case of crooked needles.

FIG. 16. The Tenaculum of Mr. Weir for securing arteries whose coats may be in such a state as to give way to the common instrument passing through them. This instrument is composed of two spring blades connected together by a sliding ring, by which means they act at the same time as Forceps; and, by retaining the artery when engaged between the most prominent parts of its circular points, the ligature is applied with the utmost facility: it also possesses the double advantage of acting as a simple Tenaculum when the points are retained in close contact by the sliding ring.

FIG. 17. The same instrument, exhibiting the internal construction of the points, the sliding ring being withdrawn near to the handle.

FIG. 18. A Tenaculum, mounted in a tortoiseshell handle like a Bistoury, and is thus rendered a commodious appendage to the set of pocket instruments.

FIG. 19. A curved Needle, with an eye at its point, useful on many occasions, sometimes mounted in the same handle with Fig. 18.

FIG. 20. A Hook with double points, particularly useful in dissecting large tumours, and for retaining various substances whose properties might elude the purchase of Forceps.

FIG. 21. The curved silver Director of Mr. Bell, with an eye at its superior extremity, recommended by that gentleman for conveying setons through tumours on the joints.

FIG. 22. A silver instrument, with a triangular steel point for piercing ladies' ears: it has a perforation about a quarter of an inch deep at its blunt extremity, into which one end of the gold wire is inserted, and of course follows the instrument through the lobe of the ear, where it is left by disengaging it from its conductor.

FIG. 23 represents the Lancet, an instrument the most generally useful of any in the practice of surgery, by whose salutary application all ranks and ages have at times been benefited, by whose timely assistance the baneful effects of sudden violent accidents are averted, and life often preserved under the most discouraging appearances of approaching dissolution. An instrument thus important in its consequences, though employed in the performance of a most simple operation, demands the most scrupulous attention to its

construction, temper, and finished excellence, especially when it is considered, that under its influence almost every description of patients, even the bravest on other occasions, have become timid and apprehensive. It is not possible to lay down precise rules for producing the requisite perfection of this instrument, it can only be attainable by long experience, and the co-operation of a reflecting head with a mechanical hand. It has been the good fortune of my house to enjoy for a long series of years an exclusive reputation in the production of these instruments. My father, very early in life, by reflection and unremitting application, discovered a peculiar mode of treating them, by which they acquired the utmost extent of perfection: this process he continued to practise many years with his own hands, till an increase of other concerns encroached so much upon his time as to render it impossible to pursue both, and he was upon the point of abandoning *this*, and of throwing its execution into the ordinary channel of business, when my mother, with a degree of spirit and perseverance that will ever redound to her honour, and which has imposed on her family obligations never to be cancelled, made herself mistress of the art, and for near twenty years conducted it with unabating industry, and with equal success; thus preserving in the family a secret of art most truly valuable, which it still retains, this department of our business being never entrusted to the care of any other person than one of its branches.

I trust I shall be pardoned for introducing this short history, and that the apparent vanity of the digression will be diminished by the consideration of its being at the same time a merited tribute of filial gratitude.

As much difference of opinion prevails respecting the shape of Lancets, and as various modes of using them are pursued by different practitioners, I have distinguished four varying forms by numbers, without presuming to recommend superiority in either, from which every gentleman may make his selection as best suited to his opinion and choice.

FIG. 24. A Lancet, for the purpose of inoculation, differing from those for bleeding, in being less delicate, and furnished with a thickness at the inferior extremity under the rivet, to prevent the scales from coming into close contact with the surface of the blade, and rubbing off the matter carried on its point. As there are few substances which have a stronger tendency to rust and injure steel than the variolous matter, I would ever recommend gentlemen, independent of the danger of unintended infection, to keep distinct instruments for this purpose, and for that of phlebotomy.

FIG. 25. A side view of the same instrument, exhibiting the position of the blade when shut between the scales.



INSTRUMENTS FOR POLYPI AND TONSILS.

FIG. 1. The instrument of Doctor Denman, termed a Ligator, for conveying and fixing a ligature upon the polypus in utero: it is simply a straight silver canula, the end intended to approach the disease rendered bulbous and perfectly smooth; and the other, furnished with a cross bar, upon which the extremities of the cord or wire are secured after having formed a stricture round the base of the polypus.

FIG. 2. The double Canula of Levrette, for the same operation.

FIG. 3, 4. Loops for the same operation, invented by the late Doctor William Hunter: these are formed of perfectly smooth well polished steel, fitted into ebony handles, and united with them so accurately as to form one continued substance without the least asperity; they are each furnished with cross pins cemented into the extremity of the handle, for the purpose of retaining the ligature in its progressive degrees of stricture.

FIG. 5. A small double Canula, similar to Fig. 2, for applying to nasal polypi.

FIG. 6, 7, 8. The instruments of Mr. Sharpe, termed the Loop, Probe, and Needle, for conveying and securing ligatures through and round nasal polypi.

FIG. 9. A pair of Forceps, for the extraction of polypi and other fungous substances. This instrument should be formed very strong from the joint to the bows or handles, and gradually decreasing in substance towards the points, which should terminate as nearly flat as possible, each being furnished with an oval opening at its extremity, the internal surface of which should be rendered concave, with small sharp teeth pointing backwards towards the joint.

FIG. 10. The Pharyngotomy, for puncturing tumours in the fauces; an instrument of singular utility in this and many other cases where it may be necessary to introduce a very sharp point to a considerable depth, but perfectly concealed till it reaches its destination, when it is pushed forward by the button at its superior extremity, and, after having accomplished its object, on ceasing the pressure, again recedes into its canula by the action of a spiral spring within the barrel. It consists of a silver case, the inferior part of which is a flat canula, slightly curved edgewise, enclosing the lancet, and screwed on to a cylinder of about two inches in length, and half an inch diameter, containing a spiral spring, through which the stem of the lancet passes, and by whose action it is constantly retained in its canula till pushed forward by the thumb applied upon the button

at its superior extremity; (a) a nut acting upon a screw formed on the stem of the lancet, by which the necessary projection of its point is regulated and determined; (b) a view of the end of the flat canula, with the point of the lancet projecting beyond it.

FIG. 11. An instrument termed a Tonfil Lancet, intended for the same operation as the former, but of a different, and less safe construction. It consists merely of a short lancet, fixed by a screw (on which it turns) into the divided extremity of a steel instrument, which serves as its case when shut, and a handle when open; it has the advantage of admitting a variety of positions, but is not protected, as the former, in its progress to the tumour. For the convenience of being carried in the pocket case, it is separated from the handle into which it is screwed when used; (a) the handle, (b) the steel part carrying the lancet, (c) the lancet itself.

FIG. 12. A pair of Scissors, distinguished by the appellation of Tonfil Scissors, for cutting off excrescences about the fauces. This instrument is made very strong, very sharp, and towards the points slightly curved in the flat direction of the blades.

FIG. 13. Another pair of Scissors, much thinner in the blades, and with their points rounded. These are better calculated to remove small excrescences from various external surfaces, where they will apply much closer than the former; and are also particularly useful in removing hair from blisters on the head too tender to bear the operation of a razor.

FIG. 14. The instrument termed a Probang, for removing extraneous bodies from the œsophagus. It is composed of a long piece of well polished whalebone, to which is very firmly attached a small round head of sponge (a).

FIG. 15. The instrument termed Thomson's Probang, from having been invented by a gentleman of that name, calculated to extract pieces of money, fish bones, or any other flat thin substances that may lodge in the œsophagus. It is composed, like the former, of a handle of whalebone, to whose inferior extremity is attached a piece of watch spring (a), three or four inches long, neatly covered with thin leather, and to this a smooth blunt hook, the capacity of whose curve is adapted to receive any substance not exceeding the ordinary thickness of a half crown piece; the elasticity of the spring, and the flattened shape of the hook, allowing it to pass easily behind the body to be extracted, with which it engages as easily on withdrawing it.

P L A T E X X I V .

T R O C A R S .

HAVING lately succeeded in the most satisfactory manner in improving the construction of this instrument, so as effectually to remedy an imperfection it was constantly attended with, I feel myself impelled to enter somewhat extensively into its description, and to draw a comparison between its former defect, and present improvement. The objection it has ever been subject to, arose from the unavoidable projection of the extremity of the canula above the surface of the steel; which, if never so well adjusted, always created a resistance at this part after the point had been introduced, which frequently foiled the operator; and, by obliging him to exert additional force to overcome it, occasioned a sensible increase of pain to his patient. Many attempts have been made to remove this obstacle, and the one that approached nearest to complete success, was a canula constructed upon Mr. André's principles (to be described hereafter), composed of three pieces of tempered steel, forming together a perfect cylinder, connected at their superior extremity by the circular concave portion, termed the cup. This cylinder, by a regular expansion at its inferior extremity, permitted the Trocar to pass through it; and, when arrived to a proper protrusion of the point, closed about it, and concealed its extremity behind a sort of shoulder immediately above the triangular surfaces (as seen in Fig. 2). Against this contrivance it was urged, and with strong appearances of reason, that, from the cylinder's thus opening in three divisions to admit the entrance and exit of the Trocar, great danger might be apprehended of its closing upon, and engaging some of the internal integuments, or the intestines themselves; and in consequence, producing the most alarming mischief. Sensible of the probability of this inconvenience, and desirous of preventing it, I varied the construction of the canula very essentially; I made it, as heretofore, of silver, with an open slit of about half an inch long at the inferior extremity, terminating towards the cup in a circular hole: this affords elasticity sufficient for the admission of the Trocar, and the subsequent collapse of the end of the canula behind its shoulder; and as the edges of the slit never approach each other nearer than represented in Fig. 1, 2, the danger before apprehended is completely removed, and the instrument altogether is introduced into the abdomen with the most perfect ease, and without the least resistance from the extremity of the canula.

Much has lately been said in recommendation of a flat instrument (for it then ceases to be a Trocar) for performing this operation, as being calculated to enter with more ease than the triangular point. This, I readily admit, it may do, if constructed sufficiently thin

to give the edges their due effect; but here a considerable impediment occurs, for the capacity of its canula will necessarily be so contracted, that should the fluid prove at all gelatinous, it can by no means pass through; and if the substance of the instrument is increased to remedy this, its edges will become so obtuse that its introduction will require considerable exertion to accomplish. I am therefore decidedly of opinion, that as the space of a round canula is almost in every instance indispensable, a triangular pointed instrument will effect its admission most perfectly. At the same time that I venture this assertion, I must add, that much depends upon the proper formation of this triangular point; it should not, as hitherto, be formed and finished upon vertical wheels, which give to each edge a concave line that increases its resistance as it advances in its progress, but (as mine always are) upon horizontal surfaces, producing three regular and equal angles, whose edges are perfect right lines, terminating in an exquisitely sharp point.

FIG. 1. A Trocar of the largest size, made upon the principles above described, enclosed within its canula to shew the perfect accuracy of their adjustment with each other.

FIG. 2. A Trocar of the second or middle (and generally the most useful) size, without the canula, representing the form of the shoulder near the termination of the triangular surfaces, behind which the extremity of the canula lodges, and is concealed; (a) the canula without the Trocar, (b) the opening at its extremity.

FIG. 3. A Trocar of the third size, *that* most in request (though it is sometimes made smaller) for the operation of the hydrocele.

FIG. 4. The Trocar and Needle of the late Mr. Pott, for the radical cure of this disease by seton; an instrument, since the more approved practice of injection, seldom asked for; (a) the external, (b) the internal canula, (c) the needle.

FIG. 5. The Trocar with spring canula of Mr. André. This instrument is formed flat, somewhat like, but thicker than a lancet; its substance reduced between the shoulder and handle to receive the canula, which, when on, exactly supplies the deficiency. The canula is composed of two steel spring plates, connected together by two screws and steady pins at their circular solid portion at the extremity next the handle; they are each formed regularly concave within, and smoothly polished to admit the easy passage of the instrument, and are so accurately adjusted, that when closed they form a complete and perfect canula. This instrument, though extremely ingenious in its construction, and admirably calculated for easy introduction, is still attended with two material objections: the first

arising from the necessarily contracted opening of its canula, which forbids the flowing of a gelatinous or thick fluid, frequently occurring in paracentesis of the abdomen, for which operation this size is particularly intended; and the second, from its being accompanied by the dangerous apprehensions described above, of the canula, in its collapse after the Trocar is withdrawn from it, engaging with, and entangling some of the internal parts.

FIG. 6. The same instrument, of a reduced size, for the hydrocele, for which operation it is far less objectionable; the fluid in this case being in general sufficiently limpid to pass through a very small opening, and the latter danger not existing in so formidable a degree. This was the specific purpose for which this instrument was originally invented, and when its mechanical principles are considered, the form of its point constructed to enter with peculiar ease, and the disposition of the extremity of its canula, whereby a second resistance at this part is effectually prevented, it will be found justly entitled to the distinguished approbation it has uniformly met with.

FIG. 7. A side view of this instrument, representing the opening of the canula to admit the passage of the Trocar.

FIG. 8. The curved Trocar of M. Pouteau, for puncturing the bladder per rectum; (a) the canula, (b) a flat piece of silver attached horizontally to its superior extremity, furnished with two openings to receive tapes, by which it is affixed to the body during the period necessary for its retention in the bladder.

FIG. 9. The Trocar and double Canula of Mr. Bell for bronchotomy; (a) the external, (b) the internal canula, (c) a stop on the internal to prevent the external one from being entirely drawn off.

FIG. 10. A Canula of an oval form, having two lateral openings near its inferior extremity, for empyema.

FIG. 11. A shorter Canula, of the same construction, for bronchotomy.

FIG. 12. The apparatus of Mr. Earle for injecting the hydrocele, consisting of an elastic bottle syringe containing about four ounces, with a brass mounting, to which is attached a hollow cylinder with a small projecting tube, adapted to the canula of the Trocar, Fig. 3, containing a small ivory ball, acting as a stop-cock to prevent the return of the injected fluid, when it may be necessary to detach the bottle for the purpose of its repletion: this contrivance is simpler, and answers the intention infinitely better than the common stop-cock, which required too much of the operator's attention to its management; while this, from the nature of its construction, acquires a principle of self-action that needs not any.

FIG. 13. The extremity of the elastic bottle, with its mounting separated from the cylinder containing the ball.

FIG. 14. The cylinder detached from the elastic bottle.

FIG. 15. A section of the cylinder, representing its internal construction and the action of the ball, by which it appears, that the force of the fluid when ejected from the bottle, drives it from the position it now occupies to the other extremity, where a small pin stops and prevents it from obstructing the canulated narrow neck, and allows the fluid its free passage, while its attempted return throws it back into the concave part of a brass perforated plug, fitted into the cylinder, and adapted exactly to receive it, which, by completely filling, prevents the possibility of the least drop of liquor escaping.



PLATE XXV.

MISCELLANEOUS INSTRUMENTS.

FIG. 1. A pair of Scissors for the operation of the hare lip. This instrument is made very strong, and of the size here represented; the shanks or handles longer than the general proportion of scissors, by which the blades, from the increased length of lever, acquire greater power, and hence the edges perform their incision with superior delicacy.

FIG. 2. A pair of Forceps for retaining the separated lip while the edges intended to be united are cut by a scalpel; a mode which many operators prefer to the Scissors. For this purpose the blades are curved at nearly a right angle: the upper one about half the breadth of the lower, and furnished with teeth internally; and the latter with a lining of horn or tortoiseshell to preserve the edge of the knife which cuts upon it from injury; the sides of the upper blade forming a rule for the incision, which, in many cases, may be made with more ease than with the scissors, and attended with a greater probability of producing a neater cicatrix.

FIG. 3. A silver Pin, of the latest and most approved construction, for securing the edges of the lip together till healed. This instrument has hitherto been made in two different ways respecting its point: in one it was foldered, and in the other screwed on to the silver. In the former, the necessity of cutting off the point after its introduction into the lip, left a rude unfinished extremity, inconvenient on many accounts, and rendered the instrument unfit for any further service; and in the latter, the intention of the screw was so often defeated by its becoming immovable from rust, as to expose it to the same necessity and inconvenience of the former. To remedy these evils, I constructed a steel point hollowed at its inferior extremity, and exactly adapted to slide on to one extremity of the pin; so that, having conducted it through its destination, it is easily drawn off, and leaves the pin in the lip with two neat round, well-finished ends, and in an unimpaired state for future use. It is necessary to add, that to prevent danger arising from any corrosive quality in the mixture of metals, I always make the pin of the purest silver. This instrument is also much in esteem for performing the twisted suture in recent wounds.

FIG. 4. The same instrument, of larger dimensions. I believe it is always preferable to employ them as large as they can be conveniently admitted; the smaller ones, when retained any considerable length of time, having a tendency to cut themselves out.

FIG. 5. The Pin, separated from its point to shew more distinctly their respective constructions.

FIG. 6. An improved Knife, with a second blade, blunt on its edges, but sharp at its point, and sliding closely parallel with the cutting one, designed to conduct the button with more ease through the extremity of a sinus: it is peculiarly adapted for the operation of the fistula in ano, but useful for many others. It is here represented in its proper state to be introduced into the sinus; the sliding blade so far advanced, that its sharp point is exactly on a level with, and protected by, the blunt one of the cutting blade.

FIG. 7. It is here supposed introduced as far as necessary, with the sharp point protruded beyond the blunt one, to facilitate the passage of the button through the gut.

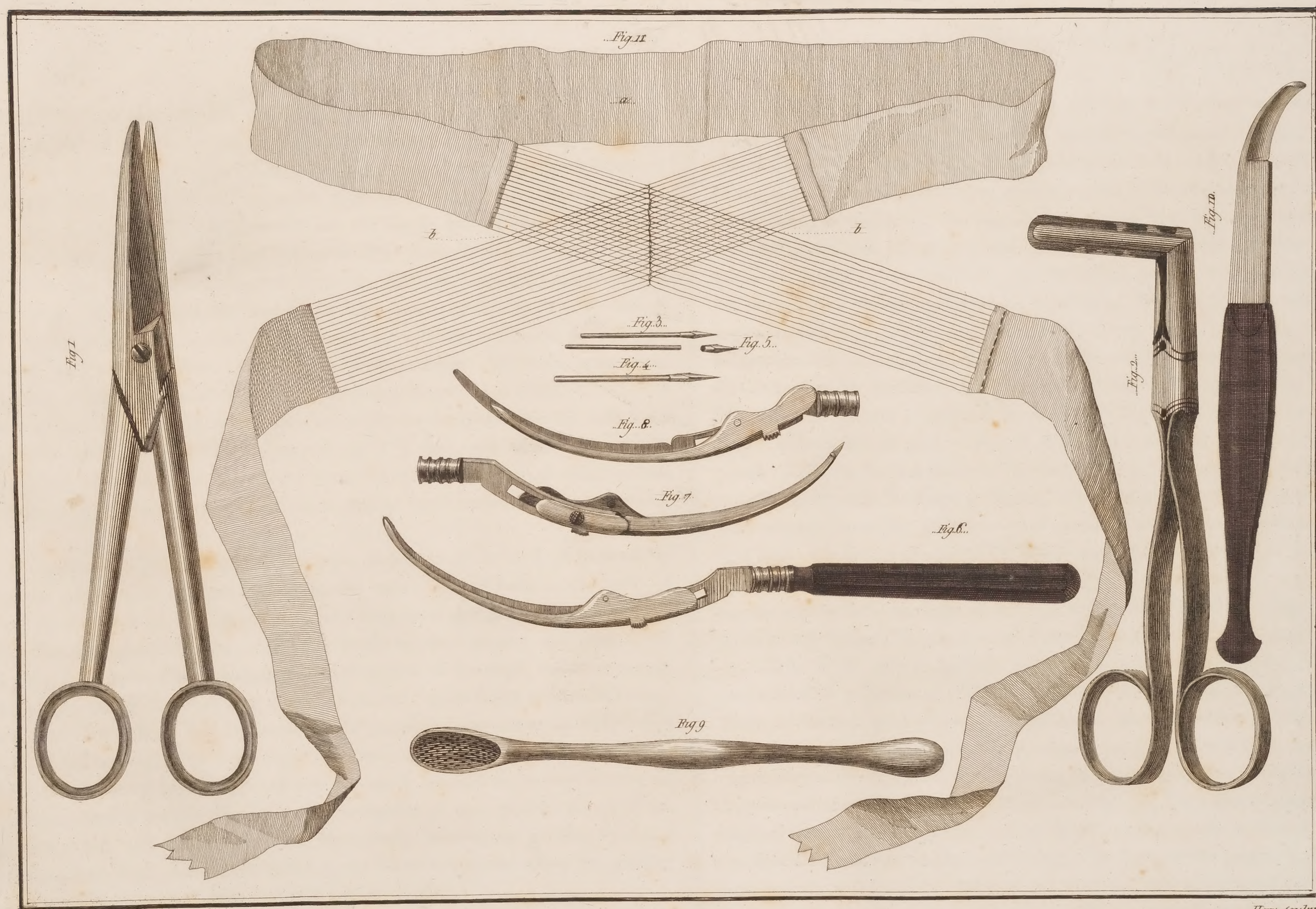
FIG. 8 exhibits the sliding blade drawn back after having conducted the button through its destination, with the edge of the cutting blade exposed, and free from all impediment to finish the operation.

FIG. 9. The double Scoop for extracting balls, already explained in Plate XXI, Fig. 11.

FIG. 10. The Knife of Professor Richter for the operation of Bubonocoele.

FIG. 11. The bandage of Mr. Dent of Dublin, for the hare lip. It is composed of three pieces of tape about an inch broad, connected together by about forty silk threads intersecting each other, and attached to each extremity of the centre, and to one of each end piece; the centre piece (a) passing round the back of the head, the silk threads are drawn close upon the lip, and, allowing the ends of the pins to pass between, form a complete stricture.

PLATE XXV.



Henry sculpt

PLATE XXVI.

SPLINTS.

IT is a matter still undecided amongst practitioners, to which of the various contrivances for retaining a fractured limb in an easy and proper position till the reunion of the bone, preference is due; or, indeed, whether *any* has as yet been produced perfectly adequate to the intention: hence many gentlemen make their own, merely from slips of strong pasteboard cut to the necessary dimensions; or use the simple splint formed of thin deal, lined with leather, and cut in longitudinal stripes to adapt it to the convex surface of the limb. One of the first authorities I can name (the late Mr. Pott) appears strongly to have favoured the latter, as the splints still known by his name consist only of solid slips of thin deal of various lengths, from four to four and twenty inches, concave within, and convex without, or sometimes lined and cut as described above. In these, as in every other implement, which the practice of surgery requires, simplicity is certainly the most essential recommendation; but as many advantages (if not complete successes) have been derived from some attempts at mechanical improvement in the construction of these very necessary machines, I have devoted two plates to the representation of those which possess the fairest claims to approbation, and which have in general been attended with the greatest success.

FIG. 1 represents a pair of Splints for legs, improved from those delineated by Mr. Bell, by the addition of a circular joint at the knee. I had been in the habit of making many as described by that gentleman, and they were generally approved, but it was almost constantly suggested to me, that they would be more proper, and more likely to complete their intentions, if they included a small portion of the thigh, and were curved at the knee so as to sustain the limb in a relaxed position; I accordingly constructed many in this mode, but they proved still incomplete, the curvature was not at all times what it was wished to be, and when it thus happened there was no means of altering it; so that, in fact, the intended advantage became the most formidable inconvenience; to remedy this I contrived a hollow circular joint, composed of two concave pieces of tin working in each other, and secured together by a strong rivet in the centre; by this I connected the leg and thigh parts of the splint at the knee, and by its action the position of the limb is occasionally varied with the most perfect facility.

These splints are formed of thin deal, adapted as nearly as possible to the natural shape of the leg, and are slightly excavated within; that on the right hand represents the

external or convex surface, and that on the left the concave or internal one; they are furnished externally with three loops of leather to pass tapes through, by which they are fastened upon the limb, and an oval opening upon each ankle; the short splint between them, made of the same materials, and excavated in the same manner, is intended to apply to the upper or inside of the leg, and to extend from the knee to the ankle; it is cut transversely through the centre, and the two parts connected together by a leather hinge, by which means either extremity may be lifted up for occasional examination, without the necessity of removing the whole apparatus. The purposes to which these machines are applied requiring variety of dimensions, it was utterly impossible to be precise in this particular; the one here represented is exactly one fourth of the largest size usually made for adults, the set consisting of two other pairs, for each leg gradually less.

FIG. 2. A pair of Splints, denominated Martin's, from the name of the inventor; they are composed of narrow slips of whalebone, stitched in longitudinally between two pieces of canvas (in the manner of women's stays) covered with leather, and formed as nearly as possible to the shape of the leg, which, from their flexible properties, they enclose with peculiar neatness; they have oval openings at the ankle, and are furnished with a tape down the centre of each side, sewed on in such a manner as to form loops for the passage of other tapes, by which they are secured upon the limb, and are thus rendered equally applicable to the right or left leg; in respect to size they fall into the same predicament as the former. These are represented of exactly half the dimensions of the largest.

FIG. 3. A pair of Splints, invented and recommended by Mr. William Sharpe, constructed of a species of papier maché, covered with thin leather, and neatly varnished. They are formed upon moulds resembling as near as possible the shape of the leg; and if it were possible that they could be adapted exactly to every limb that requires their use (agreeable to the design of the ingenious inventor) I believe would stand preeminent, as they are peculiarly light and easy of application; (aa) the under or external splint, (bb) the internal or upper one, (ccccc) leather straps rivetted to the under one, and fastened by the holes in their extremities to the three studs fixed in the centre of the upper one; (d) a strap to pass under the foot through the loop (e), and to fix upon the lowest stud; (f) an oval opening for the ankle. These are also represented of exactly half the size of the largest, the smaller gradations as in Fig. 1 and 2.

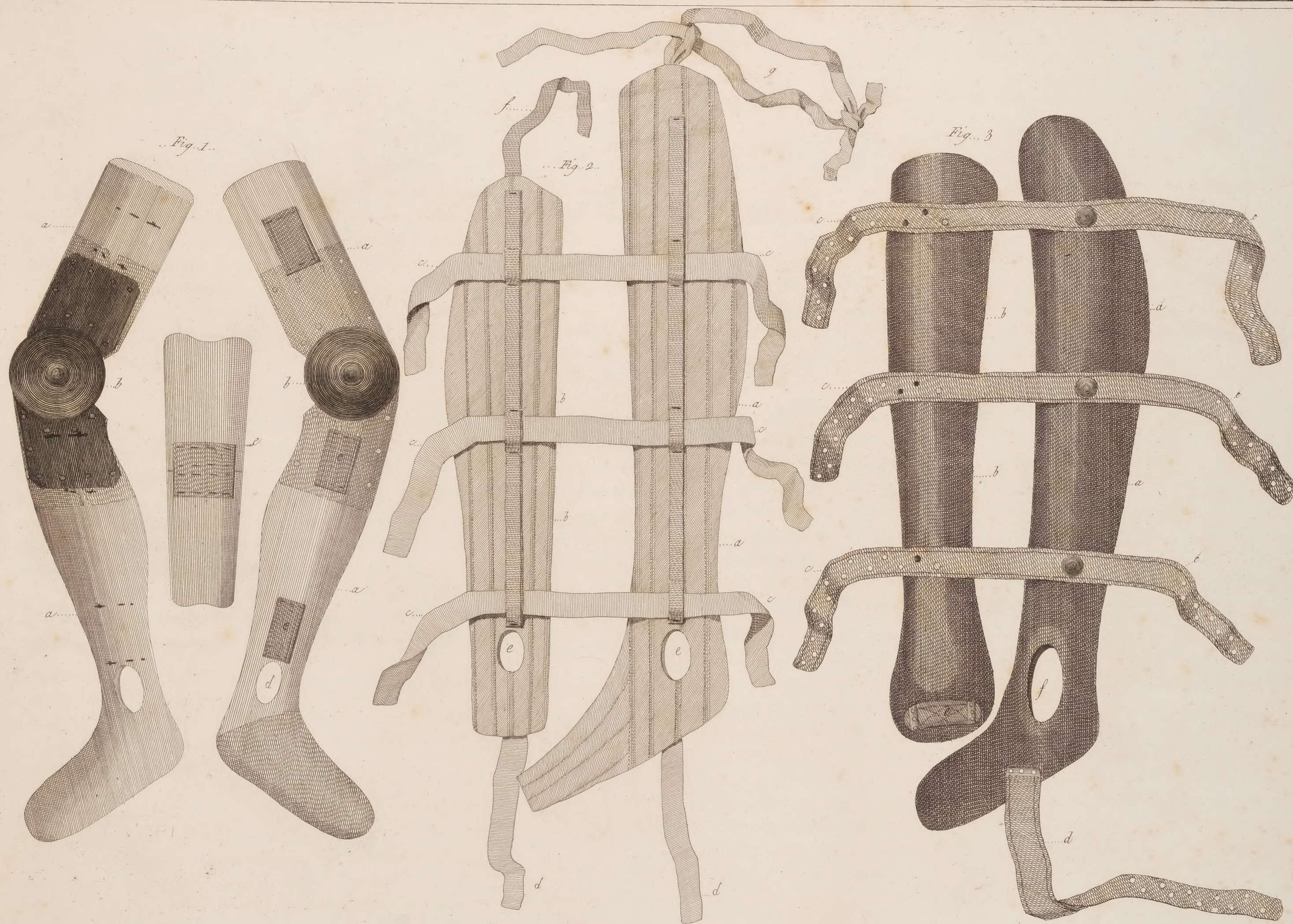


PLATE XXVII.

S P L I N T S

CONTINUED.

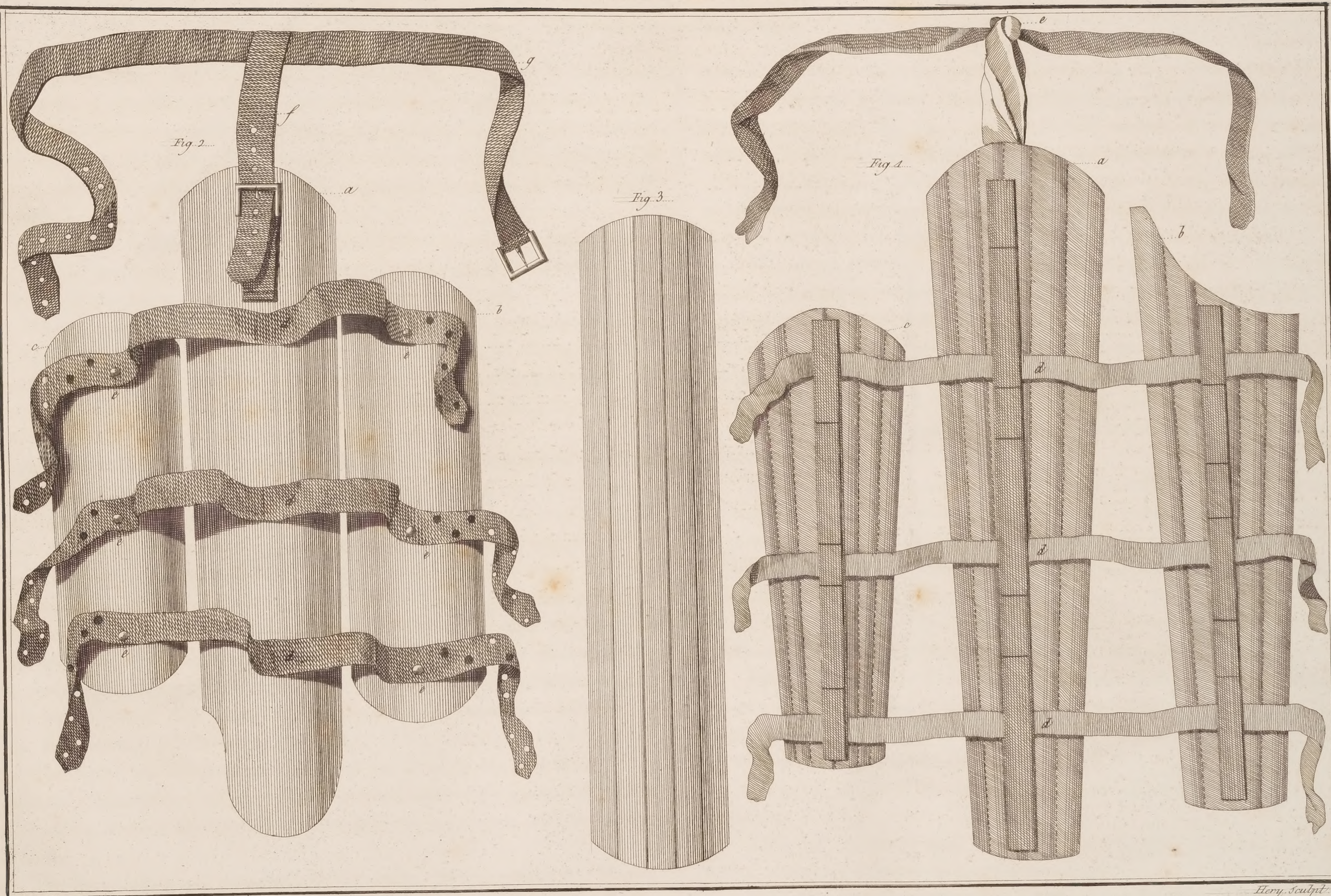
FIG. 1. A pair of Martin's Splints for the thigh, constructed with the same materials, and exactly upon the same principles, as those for the leg, Fig. 2, Plate XXVI; (a) the centre splint to apply on the anterior part of the thigh, (b) *that* for the external, and (c) a shorter one for the internal, forming altogether an inclosure of nearly the whole circumference of the limb; (ddd) tapes by which they are secured; (e) a bandage passing through a loop at the superior extremity of the centre splint, and round the waist, to prevent the apparatus from slipping down.

FIG. 2. A pair of Splints for the thigh, by Mr. William Sharpe. These are formed of light deal, excavated within, and convex without; (a, b, and c) the respective portions applying as described in Fig. 1; (ddd) three straps fastened upon the centre splint, and

attaching themselves by the holes in their extremities to the studs (e), on the two lateral ones; (f) a short strap, connected by a buckle to the superior extremity of the centre splint, and fitted to a bandage (g) passing round the waist.

FIG. 3. A representation of the thin deal Splint alluded to in the last Plate. It is formed of clean wood, of a little more than the eighth of an inch in thickness, cut longitudinally nearly through its substance, and lined with leather, by which the slips are prevented from separating entirely, and it is readily adapted to the convex figure of the limb. These are made of various sizes, and possess the further convenience of being easily reduced by the practitioner himself to dimensions more suitable to his immediate purposes.

PLATE XXVII.



Hery. sculpt.

PLATE XXVIII.

MISCELLANEOUS INSTRUMENTS.

FIG. 1. A Speculum Oris. As the purpose for which this instrument is employed requires the exertion of considerable force, it is necessarily constructed very strong; the points are covered on their external surfaces with wood or horn, as being less liable to injure the teeth than iron, and are notched transversely, to engage with them more readily when introduced; the action of the screw gradually expanding them, the intended object is thus accomplished.

FIG. 2. The small double edged Knife of Mr. Pearson for opening the temporal artery; an instrument preferable to a Lancet, as being stronger: it is also constructed in a handle to shut up like a Bistoury for the convenience of the pocket case.

FIG. 3. The compresses of Doctor Butter for making a pressure upon the temporal artery. It is furnished at its superior part with four cross bandages, to the ends of two of which alternately are sewed two small buckles, to receive the opposite straps, and also two others near the body of the instrument, to adjust it more accurately to the head, while its pressure is regulated by the screw on its top.

FIG. 4 represents the instrument without the bandages. It is composed of two short brass cylinders, each having a flat top, *that* of the upper or external one foldered on its extremity, and divided into four long loops to receive the bandages, and that of the lower or internal one screwed upon it, as the screw which gives action to the compress is inserted into this: these cylinders are accurately adjusted to move in each other, and prevented from slipping round by a projecting piece fixed vertically on one side of the inferior, and adapted to a groove in the internal part of the superior one; thus they are confined to the action of sliding upon each other in a right line: this is effected by the power of the screw upon the top acting in the lower cylinder, which causes them to approach or to separate from each other, and consequently the pressure is increased or diminished; (a) the external, (b) the internal cylinder, (c) the compresses.

FIG. 5. The Knife and Conductor of Mr. Bell for dividing the phymosis. It is ingeniously intended to introduce a concealed sharp pointed knife to the internal extremity of the prepuce; which, when it has reached, the conductor is withdrawn, and the incision made by the knife.

FIG. 6. The same instrument detached; (a) the knife, (b) its conductor. Having frequently heard complaints of inconvenience attending this instrument from the difficulty of managing its distinct parts, I ventured an attempt to remove it by rendering them

more connected, and at the same time preserving the evident utility of the original invention. In many instances where I have seen this operation performed, it has been judged necessary to remove the whole portion of skin entirely after the first incision, and the operator, in consequence, obliged to change his instrument to accomplish it: hence I conceived that it might be rendered still more complete, could it be constructed in such a manner as to be readily adapted to every exigence; I accordingly added a small improvement to it, which successfully effected this, and is further explained in

FIG. 7, representing the improved Spring Phymosis Knife. In this the Knife is concealed in the groove of the conductor, as in Fig. 5, but connected to it in the centre by a milled headed screw serving for its axis, and thus formed for the more easily unmounting the blade, and cleansing it after the operation; at the extremity (a) beyond the end of the spring, is a small piece of steel fixed at right angles, which, dropping into a square hole in the handle at (b), as it is depressed to elevate the blade, engages with a spring bolt, and becomes fixed in this position, and rendered useful as a scalpel to remove the whole of the skin if necessary.

FIG. 8. The same instrument, with its cutting blade fixed as above described; (a) the blade, (b) the grooved conductor, (c) a longitudinal groove of about half an inch in the flat shoulder of the knife, allowing it to advance rather beyond the extremity of its conductor at the same time that it is elevated, that it may more effectually reach the extremity of the prepuce.

FIG. 9. A pair of Forceps, each of whose points describe a sharp pointed double hook, useful for retaining fungous excrescences during their extirpation.

FIG. 10. A pair of Forceps, for extracting small extraneous bodies from the œsophagus, and hence called Gula Forceps; they are slightly curved in the same direction at each extremity, describing an irregular ellipsis, that the operator's hand may not obstruct his view of the object to be extracted.

FIG. 11. A pair of Forceps for dilating the ear, and for extracting extraneous bodies therefrom.

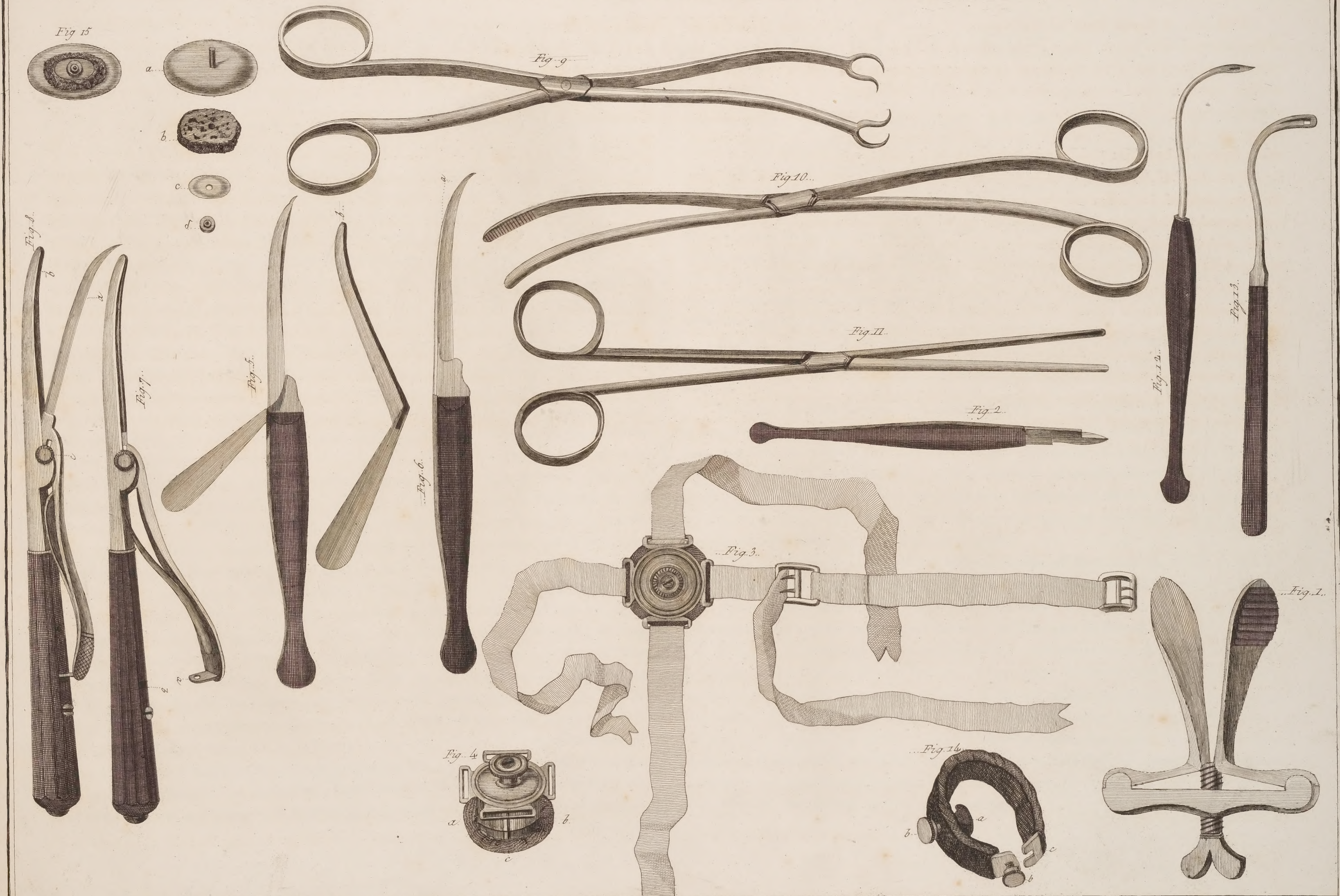
FIG. 12. A curved steel Needle in a fixed handle, with an eye near its point, useful for conveying ligatures in peculiar situations.

FIG. 13. The silver blunt pointed Needle of Mr. Home, for passing ligatures under the artery in cases of aneurism.

FIG. 14. A Jugum Penis for incontinence of urine. It is constructed of two pieces of steel covered with velvet, joined in the centre by a hinge, and forming, when shut, an oval ring: in the centre of the lowest part is a compress (also covered with velvet) (a) whose pressure upon the canal of the urethra is regulated by the milled head screw (b), at the extremity opposite the joint it closes, and is retained upon the part by the cleft end (c) falling upon the neck of the screw (d), whose action firmly secures it. This is represented of the largest size usually made, and is sufficiently so for adults in general.

FIG. 15. The instrument here delineated is intended to relieve one of the most distressing calamities to which the human frame is subject, and one of the most deplorable consequences of that inveterate disease which has so long been its scourge, that of loss of uvula; indeed it often happens that it is past the assistance of art, from the corroding nature of the disease having destroyed the continuation of surrounding substance, without which there does not exist a possibility of fixing any tolerable substitute; when this has not happened, a piece of sponge of dimensions suitable to the aperture, and properly attached to a silver plate of size and figure to cover completely its external orifice introduced into it, will, by its expanding properties, so exactly supply the deficiency, that the sufferer shall perform all the functions of these parts as before, and strangers shall not suspect that any such misfortune attends him. It has hitherto been customary to attach the sponge to the plate by sewing, but this mode is subject to numerous inconveniences: in the first

place, the fitting it to the orifice was very uncertain, and the frequent necessity of removing and cleansing it (in this case particularly indispensable) very troublesome, while the external stitches upon the concave surface produced a very unpleasant sensation, and often proved an impediment to the speech of the wearer. These inconveniences I have effectually removed by constructing the instrument upon the principles here represented; (a) a plate of silver adapted with the greatest accuracy to the dimension and figure of the deficiency; in the centre of this, upon its convex surface, is soldered a silver screw of a length proportioned to the necessary or admissible thickness of the sponge; (b) the sponge, thus so easily fitted and detached that the wearer can at any time adjust it to his own feelings, and can change or cleanse it with very little trouble; (c) a smaller silver plate to be applied immediately upon the sponge after the screw has passed through it, and to give a firmer resistance to the nut (d), which secures the whole, the edges of the sponge projecting considerably beyond those of the small silver plate, and fixing themselves by their expansion firmly into the orifice. As I have before said, if the opening in the palate is unhappily deprived of a complete surrounding substance (as is frequently the case), the attempt to remedy it is hopeless; nor should the artist, in any case, undertake the task from verbal instruction, nor unless he can have the opportunity of taking accurate dimensions from the patient himself, or, if at a distance, be provided with a very correct cast of the size and figure of the deficiency, and of the natural structure of the whole palate.



TRUSSES OR BANDAGES FOR RUPTURES.

FROM amidst the infinite variety of contrivances which invention has produced for the relief of this very general malady, I have selected two which appear to possess the most rational mechanism, and which, in the course of a very extensive demand, I have ever found to succeed the best. It will readily be admitted, notwithstanding the presuming assertions of ignorant empiricism, and the equally absurd boast of the infallibility of some *internal nostrums*, that nothing but *external mechanical* application has the least chance of relieving or curing this complaint, to which all mankind, of whatever age, sex, or degree, is more or less liable; therefore, *that* contrivance which is best calculated to supply by art the consequences of accident or the deficiencies of nature with the greatest ease to the sufferer, must have the fairest claim to approbation. It would ill become me to attempt a description of the nature and progress of this disease, or to argue upon it with an affected appearance of professional knowledge; it is enough to know, that from some predisposing causes arising from natural weakness, or from the effects of sudden violence, the intestines are liable to descend through the rings of the abdominal muscles into the groin or scrotum, and that it is absolutely indispensable that they should be carefully returned into their natural situation, and retained there by the external pressure of some artificial body substituted to supply the office of the relaxed muscles: to render this body as easy to the wearer, and as effective in its design as possible, has been the entire aim in the construction of the instrument Fig. 1. It consists of a circular bandage of untempered steel of sufficient extent to embrace two thirds of the circumference of the body, the rest of its dimensions supplied by a continuation of the padded covering with which it is enveloped, and a strong leather strap of a few inches attached to its extremity: it is furnished with a pad or compress moving on a hinge on the inferior edge of one extremity of the bandage, and forming rather an oblique angle with its right line; on the external surface of this compress is a spring acted upon by a small tongue (b), projecting from the inferior edge of the bandage between the joints of the hinge, and the force of its pressure regulated by the flat milled head screw (a): this contrivance constitutes the principal advantage of the instrument, the facility with which the power of pressure may be varied and adjusted according to the necessity of the case, or the feelings of the patient, having long been a desideratum; it also precludes the necessity of a spring round the body, ever complained of as producing painful stricture; and from this circumstance derives the additional convenience of regulating any uneasy or partial pressure of the ban-

dage by bending its untempered substance, and thus relieving the part affected. Its position too is peculiarly favourable to its effects; for applying itself round the body in a right line, it retains its situation without the assistance of that galling appendage, a thigh strap. In short, it is presumed, that the simplicity which distinguishes this instrument, its action being no other than an imitation of the pressure which the patient, from a natural impulse would make with his own hand upon the part, and which, could it be continued, would never fail to support the descending contents, will be sufficiently obvious, and entitle it to a continuance of the distinction it has already acquired; (c) a stud placed at about three inches from the extremity of the bandage, to secure the strap after it has passed through the loop.

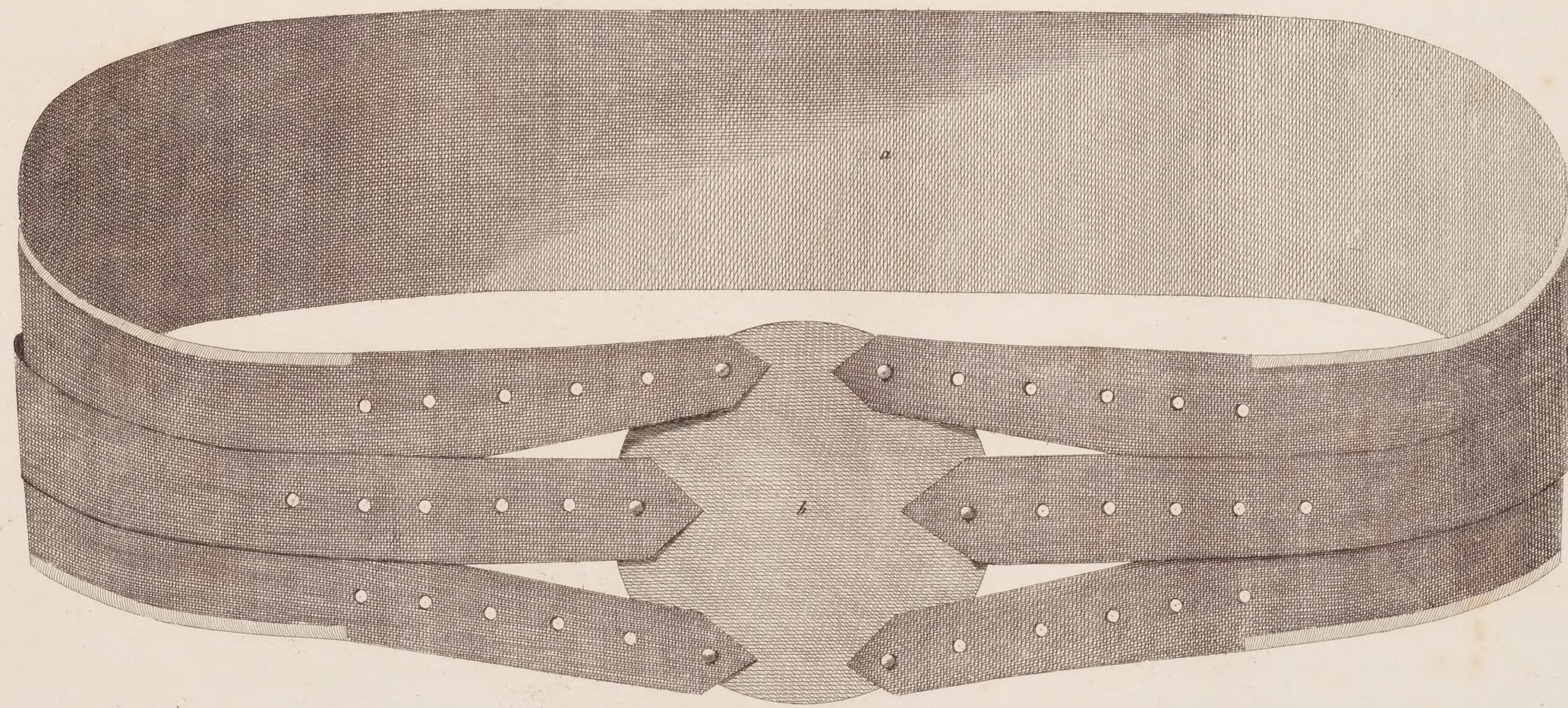
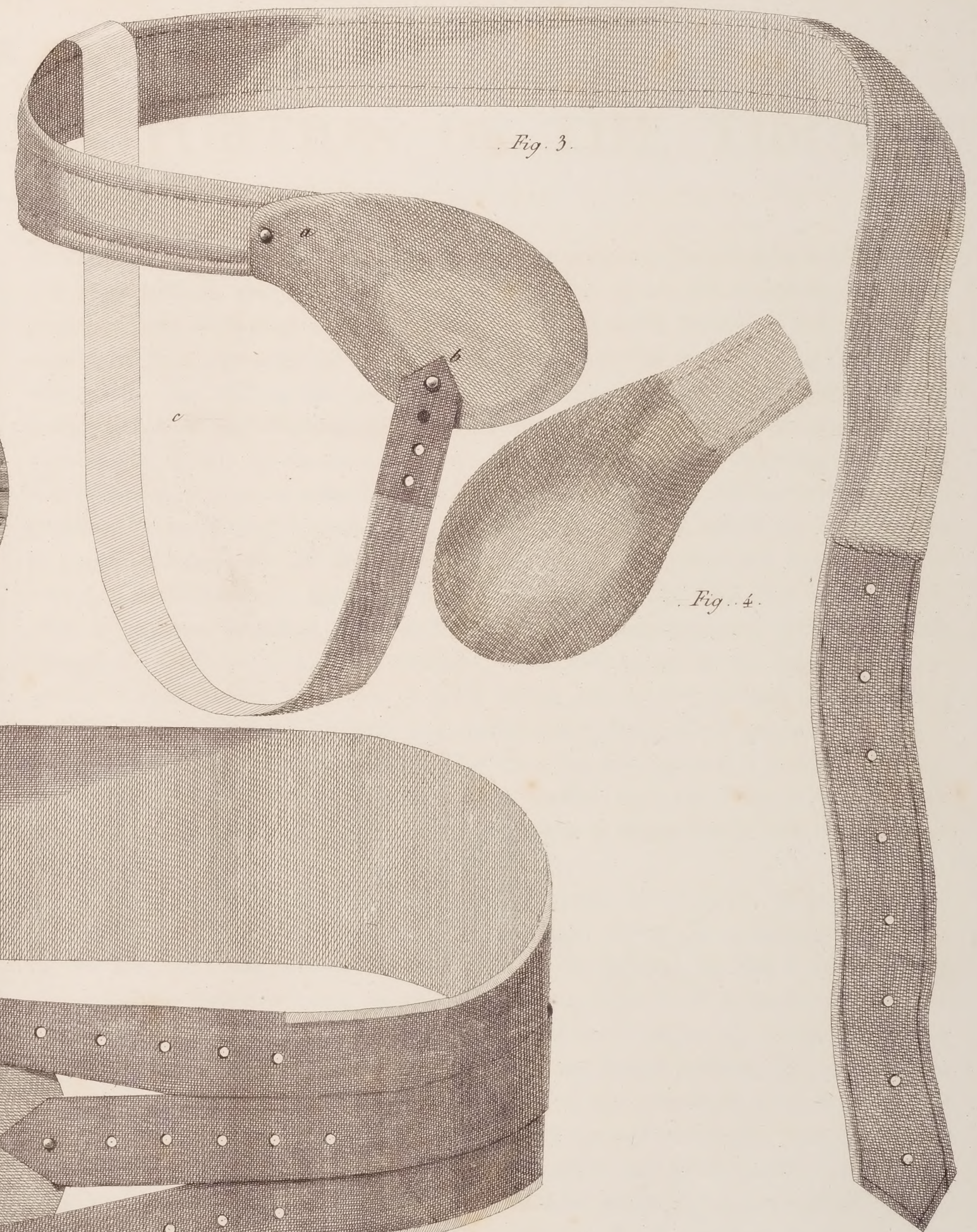
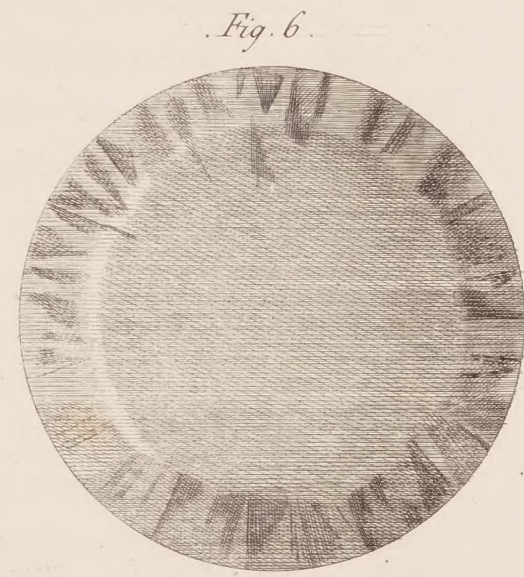
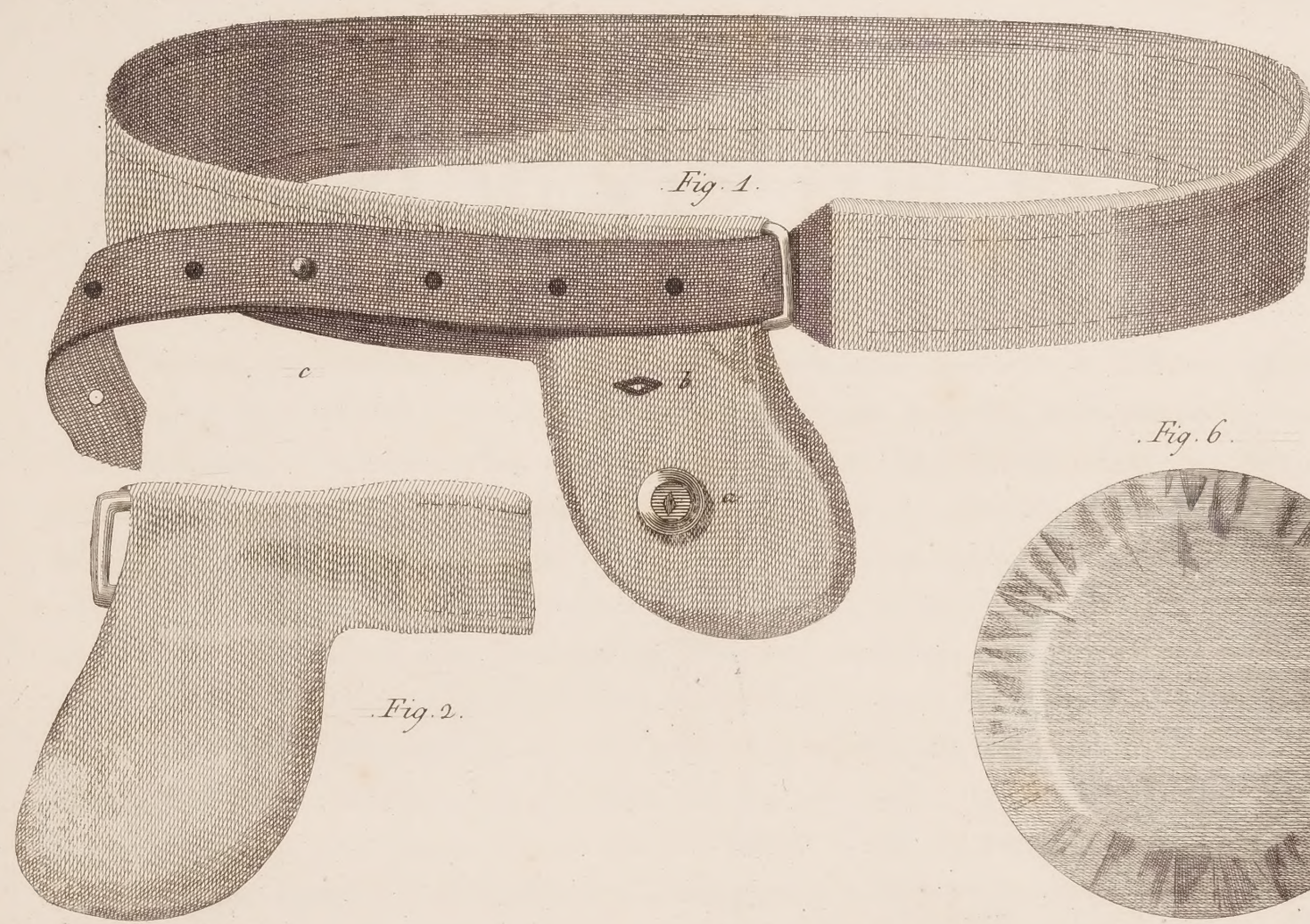
FIG. 2. A view of the internal surface of the compress, the extreme prominence of which should be somewhat flattened, and formed rather oblique in the direction of the muscles.

FIG. 3. Another species of bandage, known by the appellation of the common Spring Truss, from the circumstance of the steel part which encircles the body being tempered so as to embrace it closely, and to give the power of compression to the pad; (a) a stud at the inferior extremity of the compress to receive the end of the circular strap; (b) a second stud, to which the thigh strap (indispensable in this machine) attaches; (c) the thigh strap connected to the bandage by a loop, by which its position is easily shifted and adjusted to the most convenient point.

FIG. 4. A representation of the internal surface of the compress, which should be constructed upon similar principles to Fig. 2; the inferior edges of these compresses should have precisely that convex figure which will adapt them to the concave edge of the pubis, on which (when applied) and not on the front of this bone, it should completely rest.

FIG. 5. A Compress of the most effective construction for hernia umbilicalis. It is composed of a bandage of firm leather, of from three to four inches in breadth, neatly lined and padded, and of a length suitable to the circumference of the body to which it is intended to be applied, having at each extremity three straps to fix upon the studs on the edges of the external surface of the compress, which has internally a spiral spring projecting about an inch and a half, which, yielding to the effects of respiration, maintains a constant and regular pressure upon the protruded part.

FIG. 6. An internal view of the Compress.



INSTRUMENTS FOR REMOVING A PORTION OF THE TIBIA.

AN infinite number of saws of various forms have been invented at different times for performing this difficult operation, but none have been attended with complete success. This will cease to surprise, when it is considered that the mechanical action of a saw, consisting in a regular and continued succession of the teeth across the body to be divided, effectually forbids its application in this instance, where the confined situation of the bone denies its necessary exertion, and creates a probability of producing a most painful and dangerous laceration of the surrounding flesh and muscles: hence the inefficacy of the short, convex, or concave saws hitherto employed is obvious; for be the form what it may, its action must be governed by the first principle; which, for the present purpose, I have shewn to be inadmissible. An invention for this operation, very ingenious in its theory, appeared a few years since, but its practice failed; it was an instrument termed a Chain Saw, or a saw composed of numberless small pieces, connected to each other by joints in the manner of a chain, intended to be introduced under the bone, and, by the alternate action of the hands, worked upwards through it. Unfortunately the necessary minuteness of this instrument destroyed its intended effect, the very small space between each joint admitting but of very few teeth, and those so extremely fine as to become, as well as the joints, thoroughly clogged, and very speedily rendered useless. Many of my employers having repeatedly intimated to me the want of an efficient instrument for this purpose, and represented that, if such a one could be constructed, it would prove a valuable acquisition; I turned my thoughts towards it, and, after many unsuccessful attempts, completed the instrument Fig. 1 and 2, which, I am happy to be able to add, has succeeded perfectly. In the construction of this instrument I considered that nothing but a saw with a circular or rotatory motion could possibly accomplish the intention, and accordingly made several upon this principle; but giving them a central axis on which they moved, I found a necessity for so large a diameter to divide a very moderate size bone, that the same ill effects were produced as by the saws heretofore made use of, and my designs were, in consequence, materially impeded. By perseverance, however, I at last discovered a mode of removing the intervention of the axis, which, with a small combination of very simple machinery, effected the purpose very completely, and which, I hope, I shall be able to describe as satisfactorily.

Before I proceed to a detail of the various parts which compose this instrument, it may possibly be rendered more intelligible by pointing out the general principles of its

construction. It consists of a handle or frame of mahogany, about ten inches long, and $\frac{3}{4}$ of an inch thick; this is to be applied upon the limb at its cleft extremity, and held perpendicularly by the left hand of the operator; its security in this position is further augmented by a moveable rest covered with soft leather, and placed at the back of the instrument, thus assisting the operator in maintaining its perpendicular direction, and giving stability to the whole machine: on the front of this handle or frame is placed a circular saw of two inches diameter, but provided with teeth on only one half of its circumference, worked by a handle attached to it by a loose joint, and its rotatory motion produced by an opening or groove (cut through nearly the other half of its circumference in a continued line with the teeth) moving round two steady pins fixed in the centre of a kind of small frame; by this contrivance it acts precisely the same as if upon an axis, while it preserves the effect of its whole diameter, and acquires depth sufficient to pass through the substance of any tibia whatever. The saw, or rather the frame in which it works, is attached to a small piece of wood sliding into the anterior part of the handle; in the interior centre of both these is a corresponding longitudinal groove, in which is lodged a small spiral spring, which, acting upon the saw, gives it a constant tendency downwards, and maintains a regular and gentle pressure upon the bone, so that the operator has nothing to attend to but to keep the handle or frame steady with his left hand, and to work the saw by its handle with his right.

FIG. 1 represents the back part of the instrument, and explains the mechanism of its frame, or that portion which rests upon the limb during the operation of the saw; (a) the saw, (b) a flat piece of brass attached to the rest (ee), by which its position is changed either higher or lower, as may be necessary; (c) a screw confining the superior extremity of (b) upon one of the transverse pieces of brass fixed to the frame, (d) another screw with a milled head, by which it is retained in any desired position; (ee) the branches of the rest, which, as conveying the whole power of the instrument upon the limb, are covered with soft leather; (ffff) two pieces of brass screwed transversely upon the frame for the purpose of receiving the two screws which adjust and fix the position of the rest; (ggg) the body of the frame itself; (h) the handle by which the saw is worked; (ii) the inferior extremity of the piece of wood to which the saw is attached, sliding into the anterior part of the handle, and shewing also the groove upon its interior surface.

FIG. 2. The anterior, or that part of the instrument to which the saw is connected;

(a) the saw, (b) the groove or opening in its circumference, (c) the handle and loose joint by which it is worked, (dd) the piece of wood upon which the frame of the saw is immediately rivetted, sliding into the handle, (eee) the frame of the saw: this is composed of two pieces, the one of steel at (e) fixed to the wood, having at its lower extremity a semicircle corresponding to the external brass one (ee); two steady pins are fixed into this, between which is a screw securing them together; between these semicircles is placed the saw, which is retained in its position, and receives its circular action from the groove in one half of its circumference engaging with the steady pins and screw; (f) a milled headed screw by which the power of the spiral spring is regulated, or its action totally suspended; (g) the groove in the interior part of the handle in which the spiral spring is lodged; (hhh) the handle itself.

FIG. 3. An instrument of silver, somewhat resembling a spatula, with a handle of

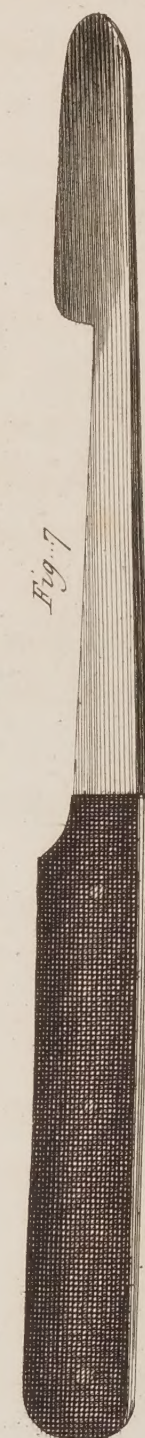
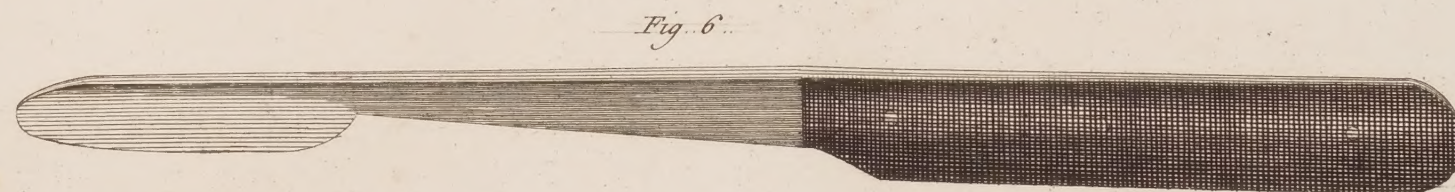
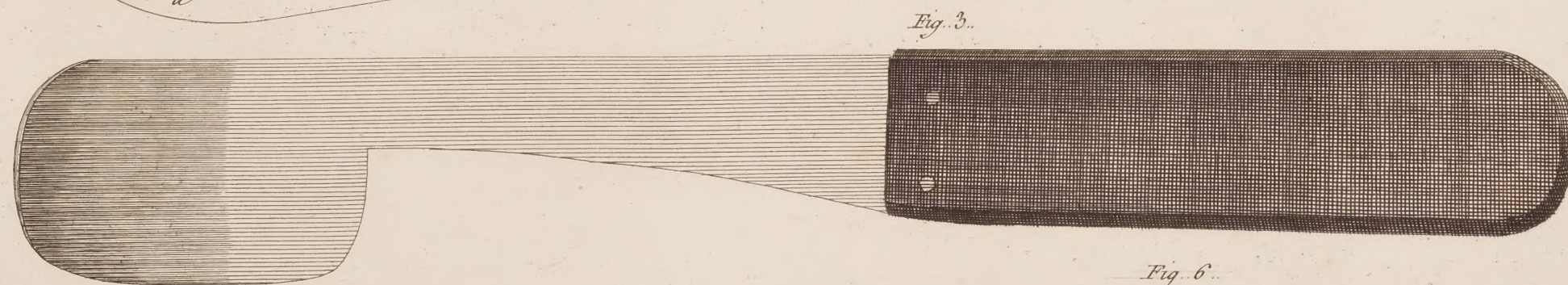
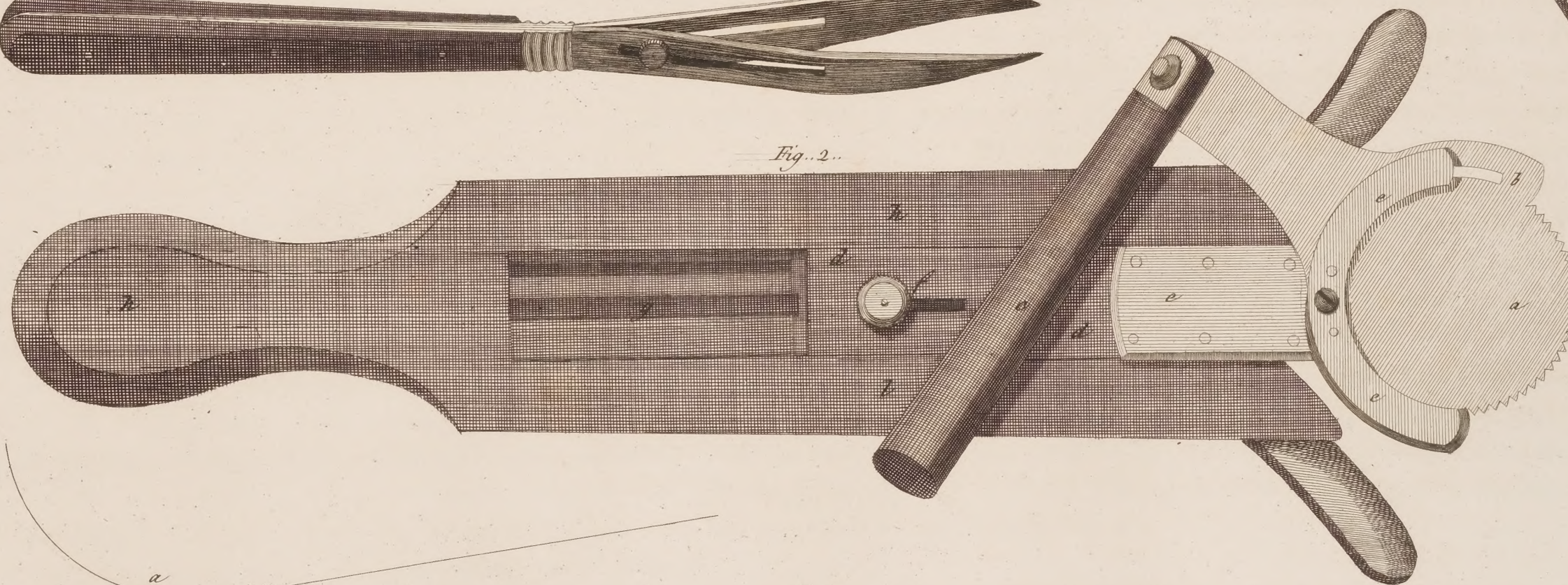
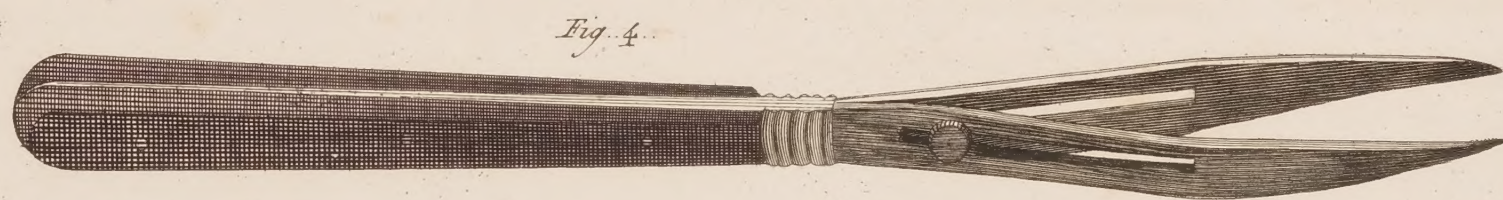
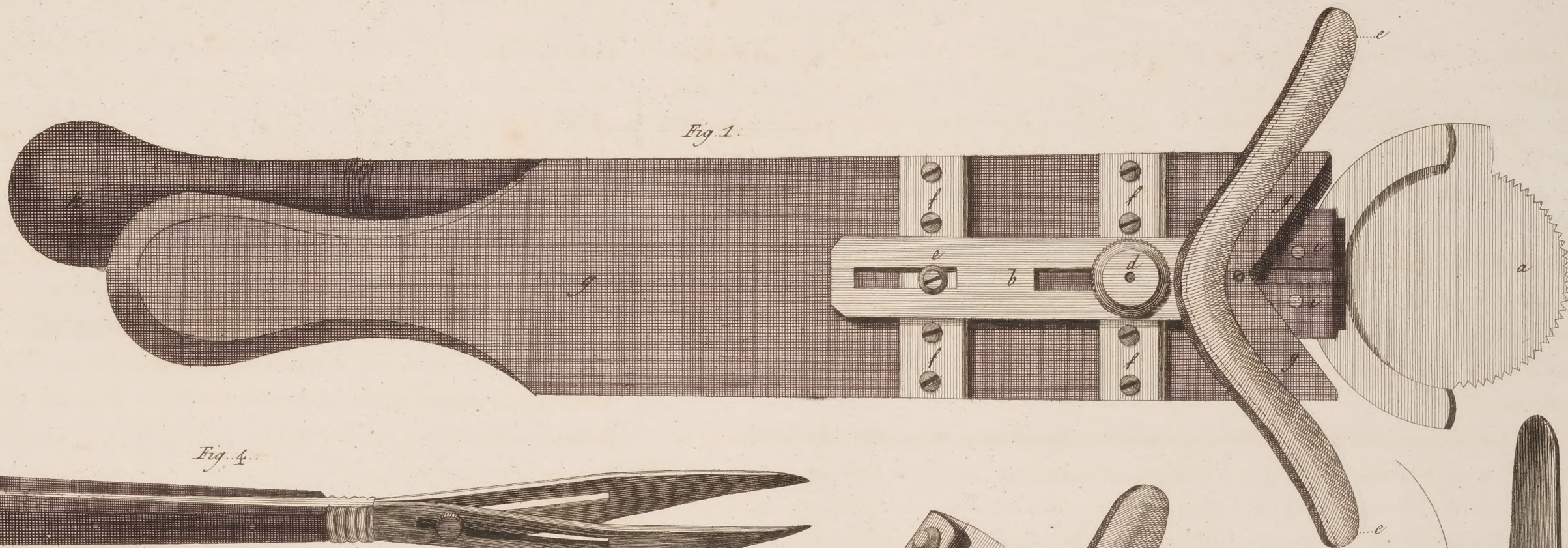
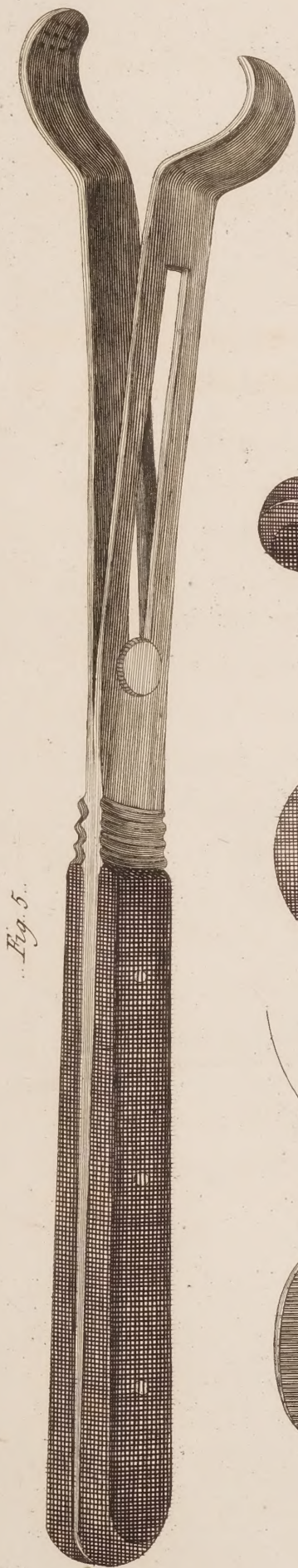
ebony curved as the line (a), intended to be introduced under the bone, to prevent any ill effects from the teeth of the saw upon the subjacent flesh, after they have accomplished its division.

FIG. 4. A pair of Spring Forceps, with a slide in a handle to lay hold of arteries, splinters of bone, &c. that may occur during the operation.

FIG. 5. Another pair of Spring Forceps, with a slide and handle, whose points are adapted to the form of the tibia, to secure it while cutting, especially the portion to be extracted as it becomes loosened by the action of the saw.

FIG. 6. A straight Scalpel, with a round point.

FIG. 7. A second Scalpel, of a similar form, but curved as the line (a). These instruments are designed to detach the flesh, muscles, &c. immediately surrounding the bone.



P L A T E X X X I .

P U L L I E S F O R R E D U C I N G D I S L O C A T I O N S .

THE machines delineated in this and the succeeding Plate I have selected from the multiplicity of contrivances for this operation, their simplicity and effect decidedly giving them the preference; the pullies now under consideration have been long in deserved estimation, they were improved to their present construction, and the centre pulley added by the late Mr. John Hunter, whose name still distinguishes them. In respect to their powers of extension, they are too manifest to need any description; but as it is merely extension which they effect, they have lately received an important addition in a broad leather strap lined and padded, which, passing round the body, and retained firmly by an assistant, forms a counter-resistance, and prevents the patient from yielding to the powerful action of the pullies.

FIG. 1 represents the mode of applying the pullies to the arm, and strong strap round the body; (a) the strap, (b) the bandage furnished with a strong staple and link to receive the hook of one of the pullies. This bandage is secured upon the arm by means of a strong tape or webbing, stitched in the centre to its upper extremity, and the two ends passing transversely and spirally to the lower, where they are tied: thus applying equally to the whole surface of the arm, rendering the purchase more firm, and preventing the danger of laceration, which might arise from a more partial stricture.

FIG. 2. The pullies as applied for the operation, one extremity fixed by its hook to the bandage on the arm, the other connected in the same manner to a ring screwed into the wainscot; though they are here represented in a straight line, their position may be easily varied in respect to the patient, by fixing the ring in the wainscot higher or lower, as the necessary direction of the extension may require.

FIG. 3. The ring, to be screwed into the wainscot, beam, or floor.

FIG. 4. The machine represented without the cords, and of its full size; (aaaaaaa) the pullies mounted in two strong frames of cast brass, (b) the centre pulley, (cc) two strong steel hooks attached to the extremity of each frame, (d) a strong staple fixed to one side of the single frame to receive and secure one end of the cord.

FIG. 5. The bandage to be applied upon the arm. It is formed of a piece of strong leather, of a suitable size, (aa) lined and padded, in which at (b) is inclosed a small oval iron plate, bent to the form of the arm to receive the rivet of the staple (c); (dddd) the tape or strong webbing secured to its upper extremity, to be passed round the arm as described in Fig. 1.

Fig. 3.



Fig. 2.

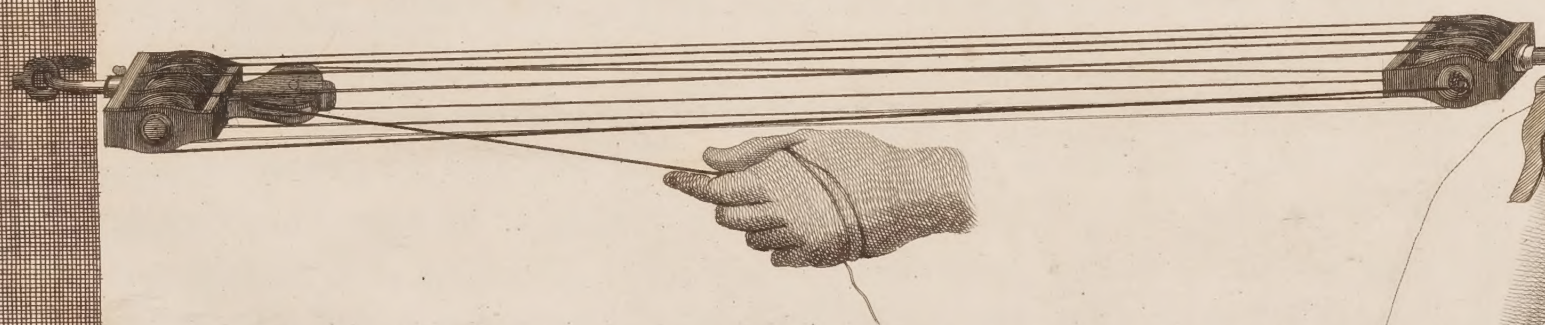


Fig. 1.



Fig. 5.

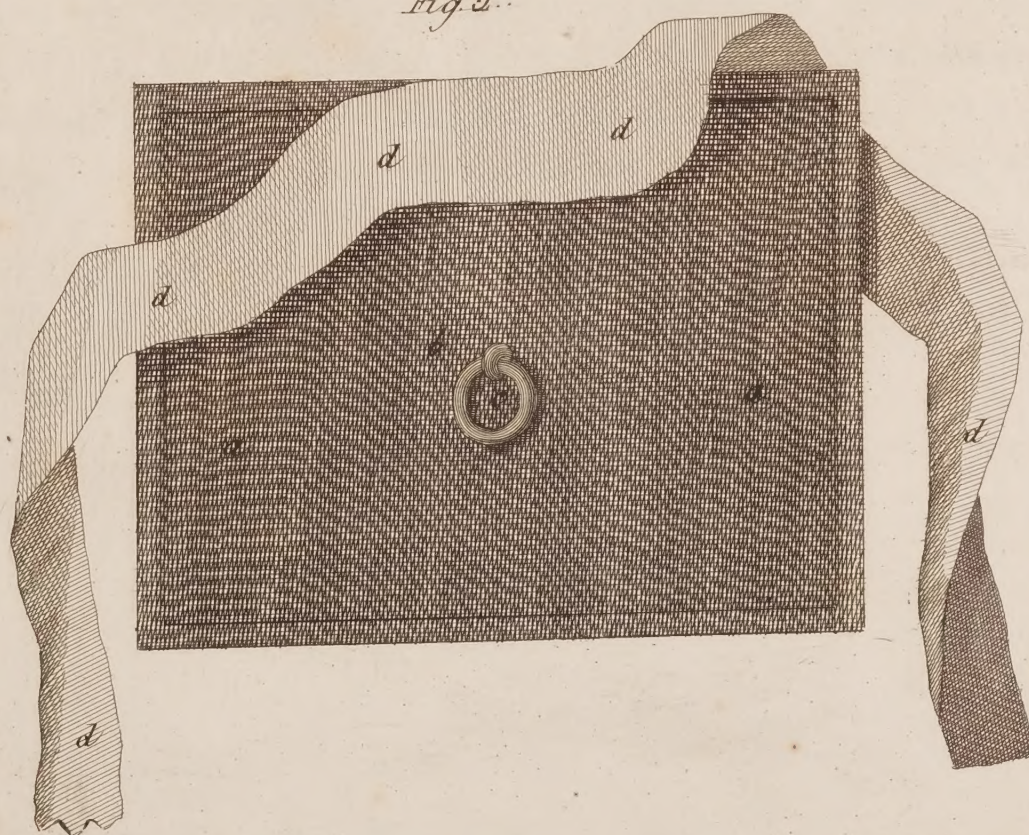


Fig. 4.

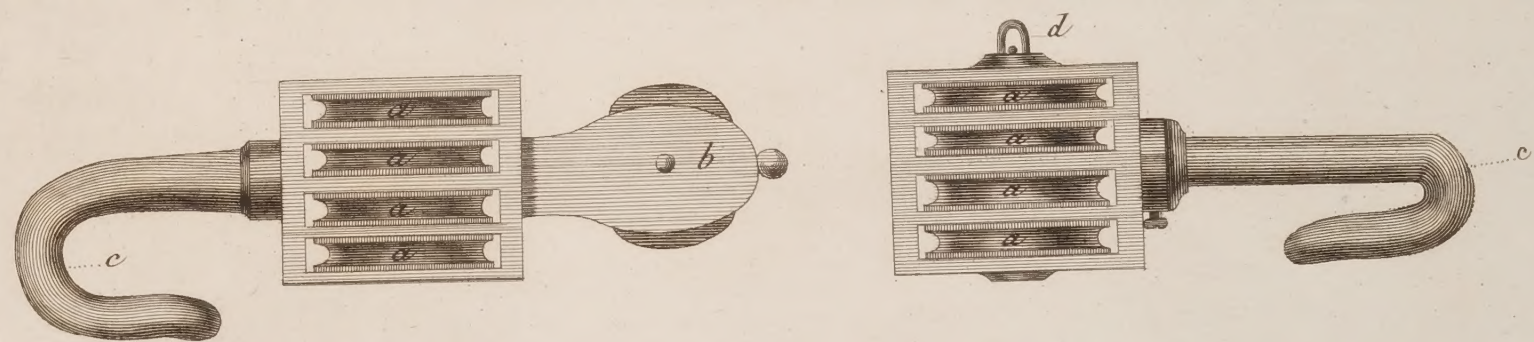


PLATE XXXII.

AN AMBÉ WITH A SCREW FOR REDUCING DISLOCATIONS.

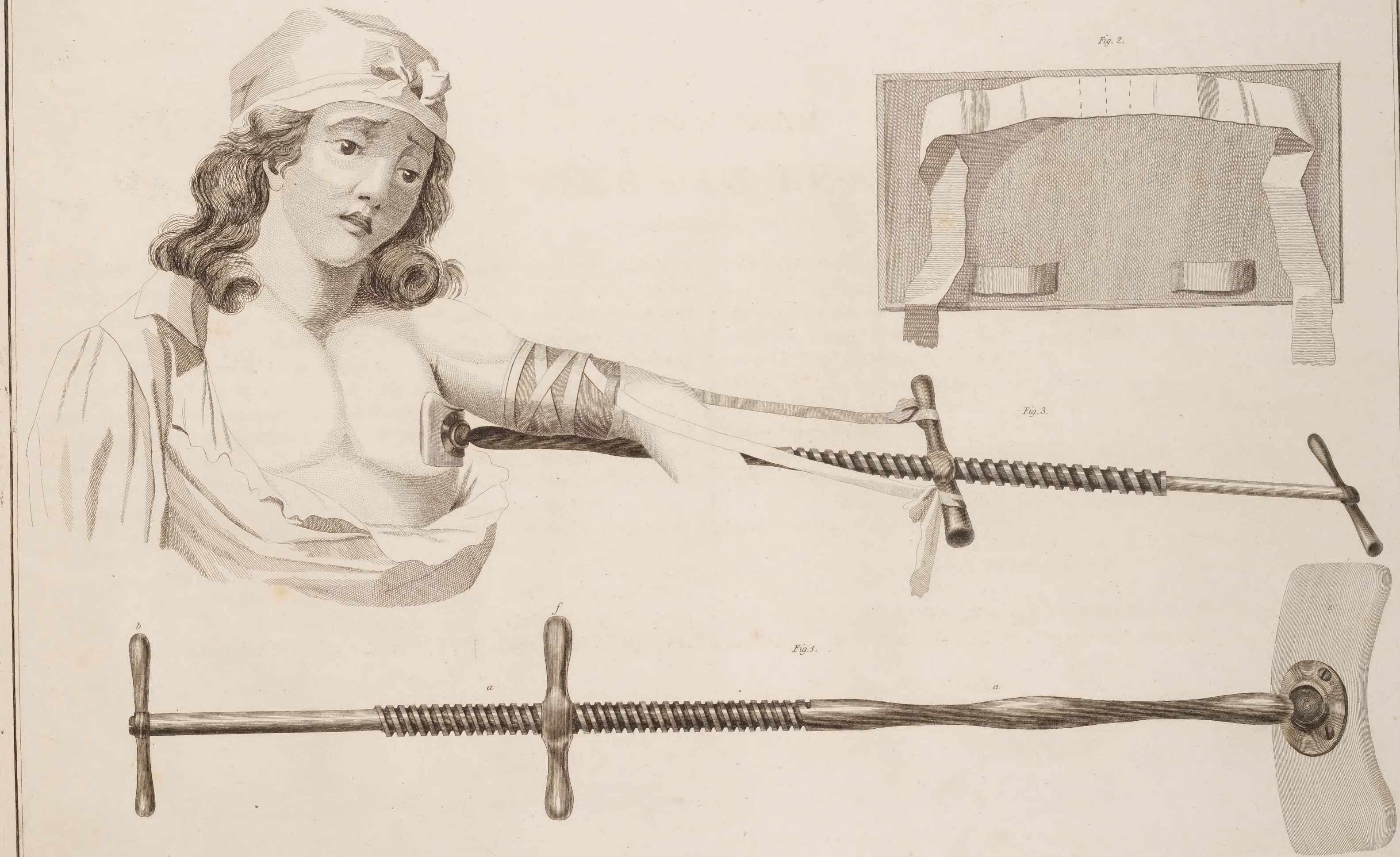
THE model of the instrument here delineated was lately presented to me by a gentleman from America. On considering the principles of its construction, I conceived it a valuable acquisition, and worthy of recommendation to public notice. It will be found to combine with very considerable powers (admitting of gradual exertion) a singular degree of simplicity, and to possess within itself the desirable properties of extension and counter-extension; while its management is so perfectly easy as to enable the operator, in most cases, to accomplish its object without the necessity of an assistant. I have made a small improvement upon its original construction, by connecting the machine to the piece of wood which rests against the body by a ball and socket, instead of uniting them immoveably; by this a motion is gained in any direction that the contingencies of the case may require, and its general operation materially improved.

FIG. 1 represents the instrument upon a scale of exactly half its necessary dimensions; (aa) a strong bar of iron neatly shaped and rounded, and furnished with a well cut worm of about ten inches in length, commencing within six inches of the handle at its lower extremity; (b) the handle fixed transversely, by which the screw is turned round; (c) a piece of firm wood, concave within and upon its upper edge, which is perfectly round and smooth; (d) a ball at the head of the instrument confined in the circular piece of

brass (e), attached to the wood by three screws, turned concave within, to form a socket for the ball, thus securing it to the wood, and allowing it at the same time freedom of action in various directions; (f) a nut suitably taped for the worm of the screw to work through, with two projecting ends, to which the extremities of the tapes after passing round the arm are tied. It will be perceived that, as the machine is turned by its handle, the nut will be drawn forward, and the limb, in consequence, extended; the wood resting against the body creating a resistance which produces a counter-extension, at the same time, and in the same proportion. It is also endowed with this further property, that it requires no attention to preserve the advantages it gains, as, from the nature of the screw, it is impossible it should recede upon any cessation of the action of the hand.

FIG. 2. A bandage to be fixed upon the arm, made of the same materials, and applied in the same manner as that described in the preceding Plate; except that near its lower edge it is furnished with two loops of leather to bring the extremities of the tapes through, after they have passed round the arm, to tie them to the projecting ends of the nut.

FIG. 3 represents the machine applied to the body as in actual use, and explains the mode by which the bandage is fixed upon the arm, and connected by the tapes to the nut.



P L A T E X X X I I I .
P E S S A R I E S .

THE instruments contained in this Plate falling more properly under a medical than a mechanical description, very little will be expected from me respecting them. I had doubts as to the propriety of attempting it at all; but as they stand connected with the general series of instruments, I thought it would not be proper to omit them altogether, and have therefore selected those most in approbation and request, which I shall merely mention under their respective appellations, without presuming to descant upon their properties, point out their supposed superiority, or recommend either to a preference.

FIG. 1, 2, 3. The globular Pessaries of Doctor Denman. These are formed of sound, well seasoned box wood, turned perfectly spherical without, and excavated within, by which they acquire peculiar lightness; they are furnished with four very small holes in any part of their surface, which, admitting air, lessens the probability of their cracking.

FIG. 4. The oval flat Pessary of Doctor Clarke. This is also made of box wood,

of about a quarter of an inch thick upon its external circumference, and gradually decreasing in substance towards its centre, where it is furnished with a small opening nearly parallel to its external edge. These instruments are also frequently made of cork covered with wax, though the former are most generally preferred; the natural heat of the parts to which they are applied soon dissolving the covering of the latter, and the absorbent nature of the exposed cork producing very obvious inconveniences.

FIG. 5. An assemblage of lines, representing the different diameters of which these instruments are usually formed.

FIG. 6. A Pessary, of exactly the same description, and composed of the same materials as Fig. 4, except that it is circular instead of oval.

FIG. 7. A second assemblage of lines, for the same purposes with respect to Fig. 6, as those of Fig. 5 are to Fig. 4.

PLATE XXXIII

Fig. 1..

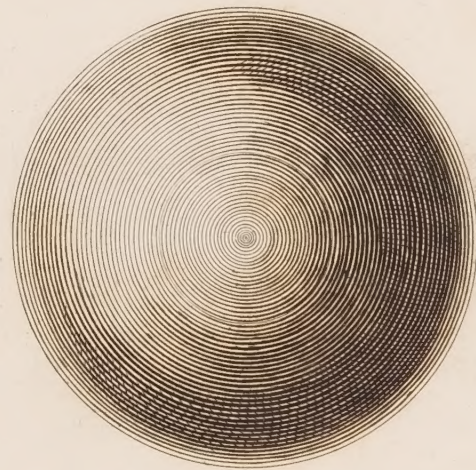


Fig 2

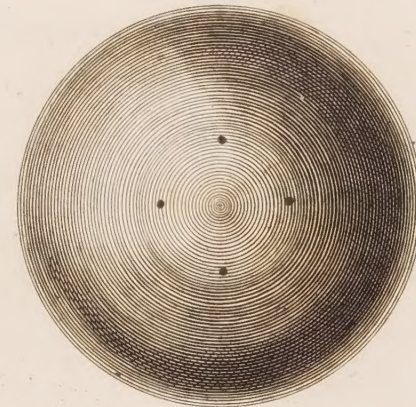


Fig. 3..



Fig. 6..

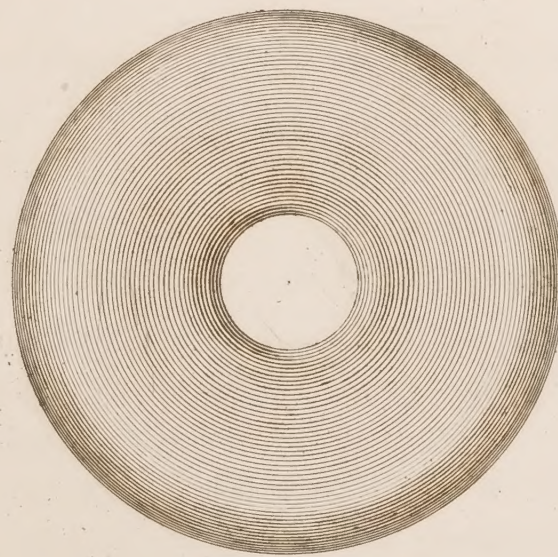


Fig. 7..

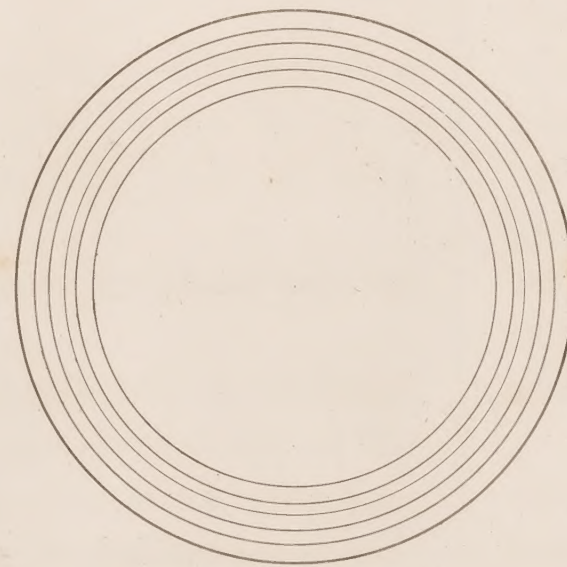


Fig. 4..

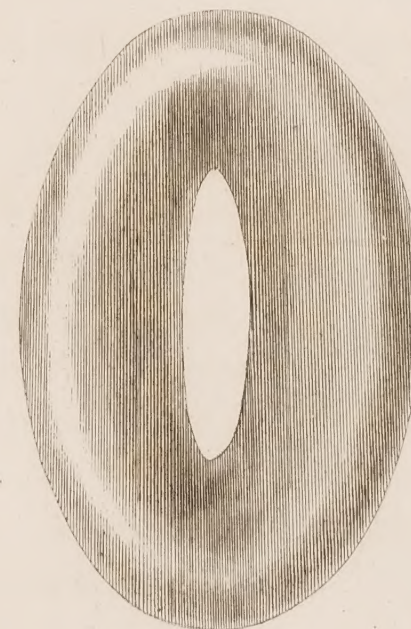


Fig. 5..

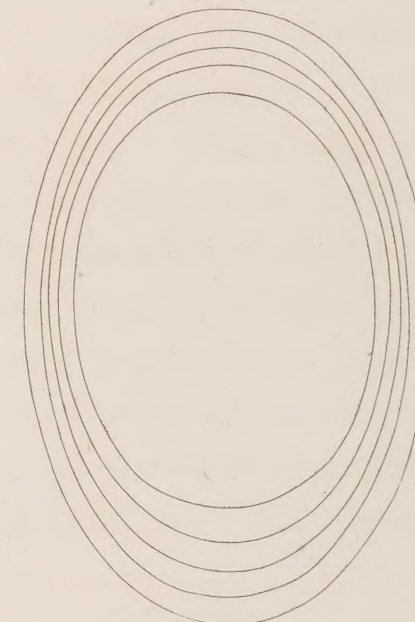


PLATE XXXIV.

THE INHALER, AND MACHINE FOR DRY FUMIGATIONS.

FIG. 1. A machine for conveying the fumes of herbs, powders, or other materials, to obstinate tumours in various parts of the body. It is constructed of copper, of the form here represented, and of about twice the size; it consists of three portions or divisions, very accurately adjusted to each other, to the lowest of which are rivetted two strong handles, by which the machine may be commodiously conveyed from place to place; (a) the extremity of the straight pipe issuing from the top of the conical or centre division, with an additional curved one affixed, to be occasionally employed; (b) an ivory tube fitted to the superior extremity of the curved pipe, to be applied when the fumes are directed to tumours situated within the mouth.

FIG. 2. The bottom of the machine, detached from the upper part; (a) an internal rim calculated to receive the heater, (bb) the handles covered with wood to protect the hands from the effects of the heat.

FIG. 3. The heater adapted to the diameter of the rim (a), Fig. 2, on which, when of a proper degree of heat, the herbs, &c. are thrown; the conical or centre division is then shut closely down upon it, and the fumes ascending through the tubes, are easily directed to the affected parts.

FIG. 4. The ivory Tube, of its full and proper size, to be introduced into the mouth.

FIG. 5. The machine called an Inhaler, and further distinguished by the additional name of its ingenious inventor (the late Doctor Mudge). The extensive celebrity of this contrivance arises not more from the beneficial effects resulting from its use, than from the simplicity of construction by which they are produced. As its application and pro-

perties have been most ably described by the doctor himself in his scientific treatise, I shall confine myself solely to an explanation of its mechanical principles. It is formed of pewter, of the exact size and figure here represented; its handle (a) is hollow, communicating at its inferior extremity with the inside of the vessel, and with the common atmosphere by three holes on its superior part; the top or cover is provided with a cylindrical projection in its centre to receive the extremity of the flexible tube, and on one side of this at (b), with an inverted tube of near an inch in length, and of a conical figure, at the bottom of which is lodged a ball of pith, cork, or ivory, acting as a valve; thus when the patient inspires he necessarily draws the air through the handle, and with it the fumes from the warm water, simple or medicated, and as he expires his breath escapes through the hole covered by the valve in the inverted tube (b); (c) a small flat piece of brass furnished with holes to cover the top of the inverted tube, to retain the ball in its place, and to permit the passage of the air which the patient expires; (d) a flexible tube, composed internally of silvered wire twisted spirally upon a triblet, covered with bladder, and afterwards with Morocco leather, and again secured by wire twisted upon it externally in a spiral direction from one end to the other. It is furnished at one extremity with a hollow wooden socket, adapted to the projecting tube in the centre of the cover of the vessel, and at the other with one of ivory, having a male screw to attach to the ivory pipe (e), which, for the sake of cleanliness, is thus constructed to take on and off.

FIG. 6. A section of the cover; (a) the external projecting tube to receive the extremity of the flexible pipe, (b) the inverted tube, with the ball valve lodged upon the hole in its lower extremity.

THE INHALER AND MACHINE FOR DRY PULVERIZATION

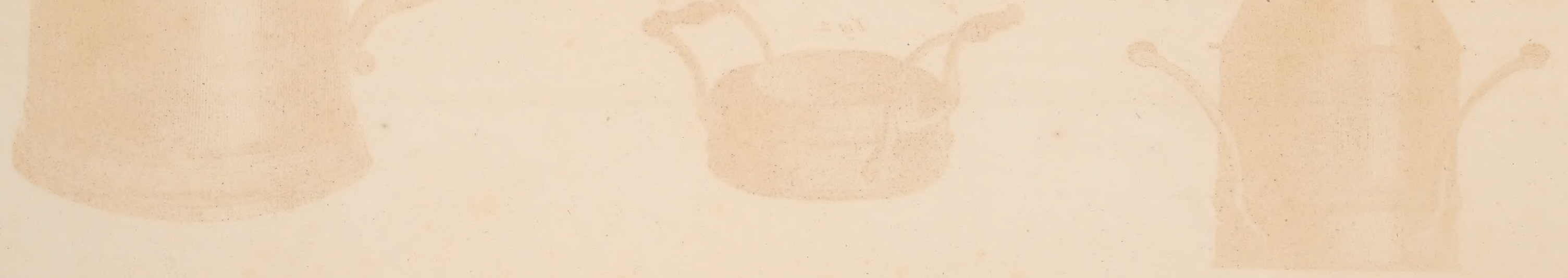
PLATE XXIV

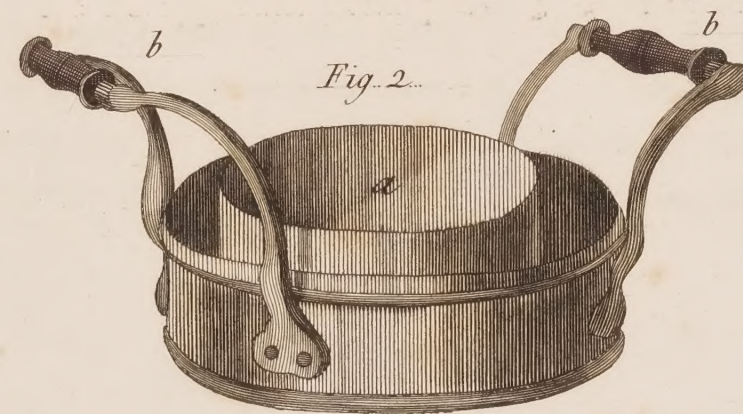
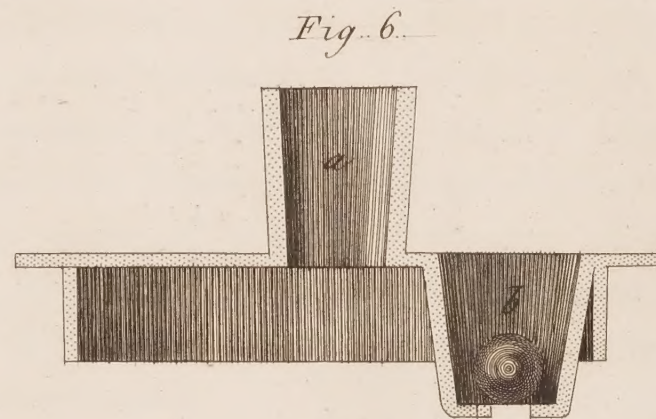
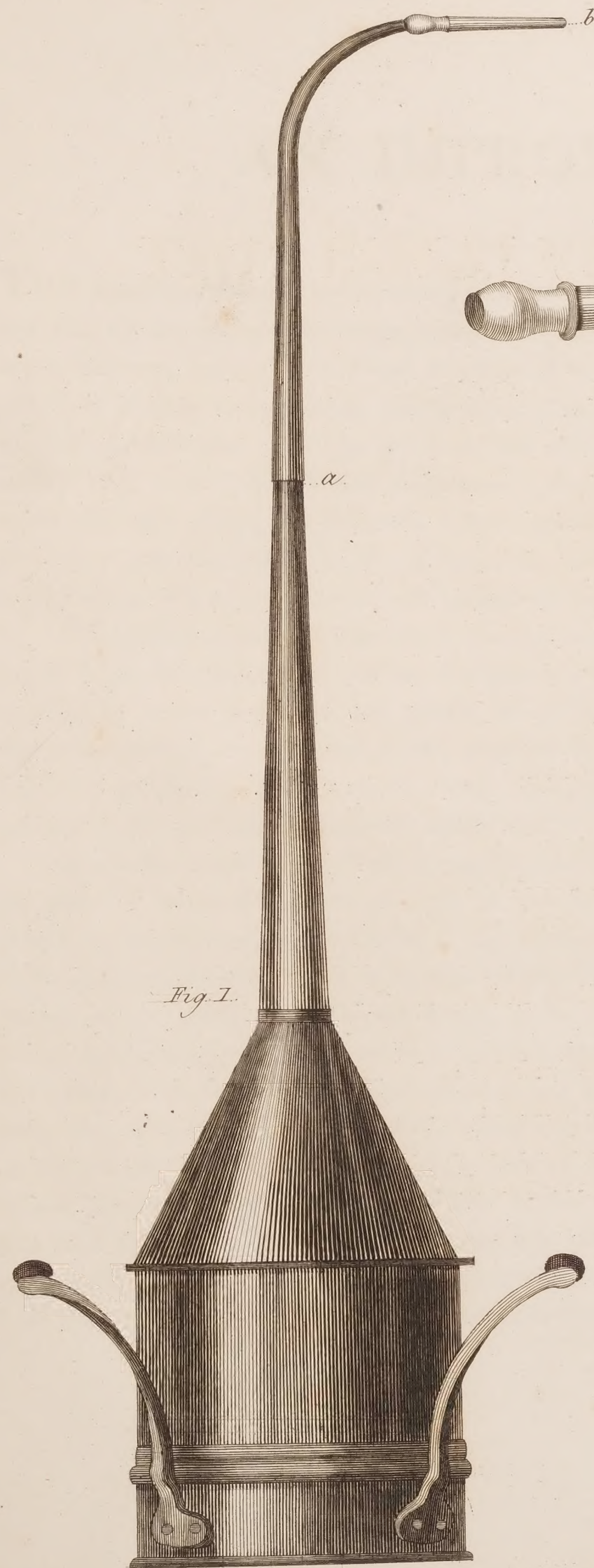
FIG. 1. A perspective view of the inhaler and machine for dry pulverization, showing the main parts and their relative positions. The device consists of a large cylindrical chamber (A) at the base, which is connected to a smaller cylindrical chamber (B) at the top. A long, flexible tube (C) is attached to the side of chamber B, and extends upwards and outwards. The tube is provided with a series of small openings (D) along its length, which serve to distribute the pulverized material. The entire apparatus is supported by a sturdy base (E). The design is intended to facilitate the efficient pulverization of dry substances and their subsequent inhalation.

FIG. 2. A perspective view of the inhaler and machine for dry pulverization, showing the main parts and their relative positions. This view highlights the internal components and the mechanism for pulverization. The large chamber (A) is shown in cross-section, revealing the internal structure, including the grinding mechanism (F) and the collection chamber (G). The smaller chamber (B) is also shown in cross-section, illustrating the internal passages and the connection to the flexible tube (C). The base (E) is shown in detail, highlighting the support structure and the access points for the pulverized material.

FIG. 3. A perspective view of the inhaler and machine for dry pulverization, showing the main parts and their relative positions. This view shows the device from a different angle, emphasizing the flexibility of the tube (C) and the ease of use. The large chamber (A) is shown in cross-section, revealing the internal structure, including the grinding mechanism (F) and the collection chamber (G). The smaller chamber (B) is also shown in cross-section, illustrating the internal passages and the connection to the flexible tube (C). The base (E) is shown in detail, highlighting the support structure and the access points for the pulverized material.

FIG. 4. A perspective view of the inhaler and machine for dry pulverization, showing the main parts and their relative positions. This view shows the device from a different angle, emphasizing the flexibility of the tube (C) and the ease of use. The large chamber (A) is shown in cross-section, revealing the internal structure, including the grinding mechanism (F) and the collection chamber (G). The smaller chamber (B) is also shown in cross-section, illustrating the internal passages and the connection to the flexible tube (C). The base (E) is shown in detail, highlighting the support structure and the access points for the pulverized material.





AN IMPROVED MACHINE FOR FRACTURED LEGS.

THE machines formerly invented and used for the purposes of receiving fractured limbs, and with the intention of defending them from the pressure of the bed-clothes and other inconveniences, having been found so confined in their principles, so cumbersome and awkward in their management, and so entirely incompatible with the improved modern method of treatment, as to be generally laid aside; and, at the same time, it being admitted, that, with some essential alterations in their construction, they might still be rendered not only useful, but desirable, I have endeavoured to collect their most necessary properties into one object, which, as it cannot claim the originality of invention, I have considered in this representation, and subsequent description, as an improvement.

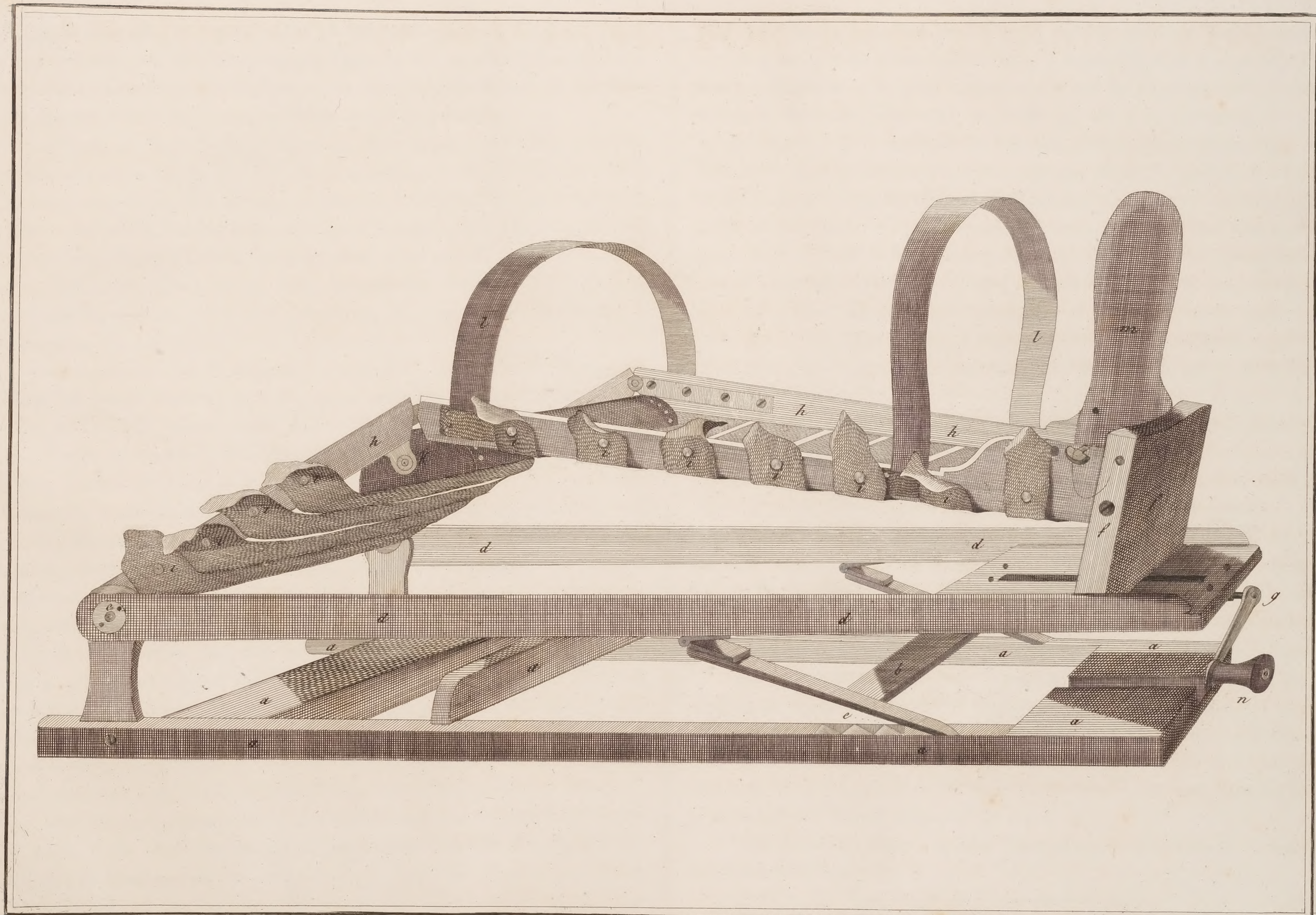
The intention, then, of this improvement is to afford the easiest position to a fractured leg or thigh, to render that position straight or relaxed, and to vary either in different degrees, by means so gradual and gentle, as not in the least to distress the patient. As several properties are comprised in this machine, it is necessarily somewhat complex; the following description of it, however, I trust, will prove sufficiently intelligible to render its principles and construction perfectly understood.

It is represented upon a scale of exactly one fourth of its usual dimensions: its frames are made of seasoned oak, and as light as may be consistent with its necessary strength; (aaaa) the lower frame or foundation of the whole machine, the groove perceptible at its superior extremity is intended to receive (when shut) the screw attached to the inferior surface of the plane of the centre frame, to be described hereafter: (dddd) the centre frame, connected to the lower one at its inferior extremity by a joint at (c), allowing it various degrees of elevation, in any of which it may be retained by the feet of the small iron frame (b), connected to (dd) by joints, falling into the notches (e) of the lower frame (aa), in the manner of a reading desk; (f) a piece of wood sliding vertically upon the plane which connects the sides of (dd) together: in the centre of the under part of this piece is a small hole (its edges fortified by a thin iron plate) adapted to a pin, projecting from a female screw passing through the groove of the plane, and receiving the male screw (g); both extremities of which being secured beneath the plane (as seen by the rivets), its action,

by turning the handle (n), necessarily causes the vertical piece to advance or recede, which, fixed at its superior extremity to the upper frame, thus varies its angle at (k), forming a greater or less degree of curvature as may be wished, and producing this variation by such insensible degrees as to be imperceptible to the patient. (hhh) The upper frame, which immediately receives the limb; this is also connected to the centre and lower frames at the joint (c), and at its other extremity to the centre one only, at the superior part of the upright piece (f); it thus admits of two motions at the same time, and without interfering with each other: of elevation, by raising the centre frame, and fixing its degree in one of the notches (e) as before described; and of variation of its angle or curve at (k), by the action of the screw (g). (iii) Pieces of strong tape or webbing, forming the bed on which the limb is deposited: these are firmly fixed to one of the sides of the frame (hh), and connected to the other by button-holes attaching to the studs, with which it is provided; thus allowing the convenience of examining or dressing any particular part of the limb without deranging the whole. (k) A convex cushion covered with soft leather, suspended upon moveable joints at the angle of the frame (hh): this is intended to support the limb at the flexure of the knee, and is slightly excavated in its centre, to prevent the interruption of circulation in the vessels with which this part abounds. (ll) Two hoops of thin flexible wood, adjusted by loops of tin to the sides of the frame (hh), to support the bed-clothes, and to protect the limb from their uneasy pressure. (m) A piece of wood termed the foot-board: this is connected to the extremity of the frame (hh) by two moveable pins forming a pivot, on which it is suspended, and which removes any uneasy restraint to the foot resting against it, by allowing it its easiest and most natural position. This part of the upper frame being furnished with a row of several holes to receive the pins, the foot-board may be readily adjusted to the different lengths of the various legs that may employ the machine.

Since the engraving of this Plate a slight alteration has been suggested, and will be hereafter adopted; that of reducing the upright pieces at the extremity of the lower frame, and connecting with it the joint (c) of the centre to one half of their present height.

PLATE XXXV



Hery scul

P L A T E X X X V I .
M I S C E L L A N E O U S .

HAVING now gone through the regular series of the most generally required instruments, I have reserved this and the Thirty-eighth Plate for the representation of a few others, that have either escaped my recollection in the foregoing selection, or that have been invented or improved since the commencement of the undertaking.

FIG. 1. An instrument for extracting stones or other extraneous bodies from the urethra. It consists of a silver canula (a), with an open bulbous extremity, and of a fillet of steel (bb), having a ring at one end by way of handle, and being slit down for about an inch and a half at the other, formed into a species of forceps of a spring temper, and near the points each blade slightly curved inwards; thus when pushed forwards through the canula they expand, and, having in this state encompassed their object, on pulling them back they secure it, and are withdrawn altogether; (c) a ring upon the canula, to receive the fore finger of the left hand.

FIG. 2. A very ingenious, though somewhat complicated, instrument for the extraction of stones from the female bladder; it is the invention of M. Herbiniaux: as a mechanical production it does him infinite credit; and as such I here attempt its description. It consists of three blades or branches, so ingeniously connected at their joints that the compression of their handles produces their regular and equal expansion: thus expanded, when in the bladder, the stone is readily engaged between them; and, if the urethra will admit of the necessary dilatation, as easily extracted. This figure represents the instrument closely shut together, the blades uniting forming a concave surface similar to that of a blunt gorget, and the centre of the three points, (a, b, c), a bulb or beak to be introduced along the groove of a staff; (d) the joint by which the two upper blades are connected (that of the third, or under one, not being visible); (ff) the handles of the two upper blades; (g) a milled head screw securing one of the ends of the two pieces of steel (hh), connected at their other extremities by moveable joints to the handles (ff), and which, as these are pressed towards each other, act upon the third blade, and give it its equal share of expansion; (i) a spring between the handles of the two upper blades, by whose action the points are kept closely united till separated by the pressure of the hand.

FIG. 3 represents the instrument with its blades distended, and its mechanism more clearly displayed; (a, b, c) the three blades; (d) the joint connecting the two upper ones, and attaching also *that* of the lower by the insertion of its screw into the inferior part of the joint (e); (ff) the handles of the two upper blades; (g) the milled head screw described above; (h) the extremities of the connecting pieces between the handles. The internal surface of each blade is furnished with small teeth pointing backwards towards the axis; the inferior blade is of a triangular figure, its internal angle falling in between the inferior parts of the two upper blades; it is convex externally, so that when the three are closely shut together, they form one regular, smooth, and well polished surface.

FIG. 4. The instrument invented by Frere Com for the operation of Lithotomy.

As it has obtained considerable celebrity, and has also been lately introduced into practice in this country with much approbation, I conceived that a representation of its figure, and a description of its construction, would not be unacceptable: (a) the body of the instrument effectually concealing the knife (b), when its extremity (f) is not pressed upon by the thumb. It is made of the size and substance here delineated, its point (a) being reduced to a proper thinness to enter and pass along the groove of a staff; (c) the handle, of an irregular hexagonal figure, whose varying surfaces give different degrees of elevation to the cutting blade; for this purpose it is moveable round the stem or shank of the instrument, and retained in its desired position by the end of the spring catch (d) falling into one of the notches in the steel ferrel (e); when thus fixed, the extremity of the cutting blade (f) behind the axis being pressed down upon whichever surface may be presented to it, gives to its point its precise degree of elevation; (g) a spring which keeps the cutting blade constantly concealed in the sheath till it is raised by pressure upon its inferior extremity.

FIG. 5. A section of the handle, representing the utmost projection of its different surfaces where they meet the point of the inferior extremity of the cutting blade. The figures marked round it are usually engraved upon the respective surfaces, to denote the different degrees of elevation thus produced upon the cutting blade.

FIG. 6. An instrument for dilating the prepuce in cases of Phymosis. I am not certain to whom we are indebted for this contrivance, which combines much ingenuity, simplicity, and effect. The upper part of it is composed of brass, and the lower, consisting of three expanding branches, of tortoiseshell, or any other compact substance that will admit of a smooth, and well polished surface: (a) a screw passing through the frame or body of the instrument, and acting upon a nutt (b), connected to the branches by the small rods (c), having at each of their extremities a moveable joint; as this is pushed forwards by the action of the screw, the points (d) are necessarily and equally expanded.

FIG. 7. A handle for the Amputating Saw, of a different and late improved construction, affording a firmer and more convenient hold, and bringing the hand nearer to a level with the line of action of the saw.

The remaining figures of this Plate comprise a collection of small instruments for botanical dissections.

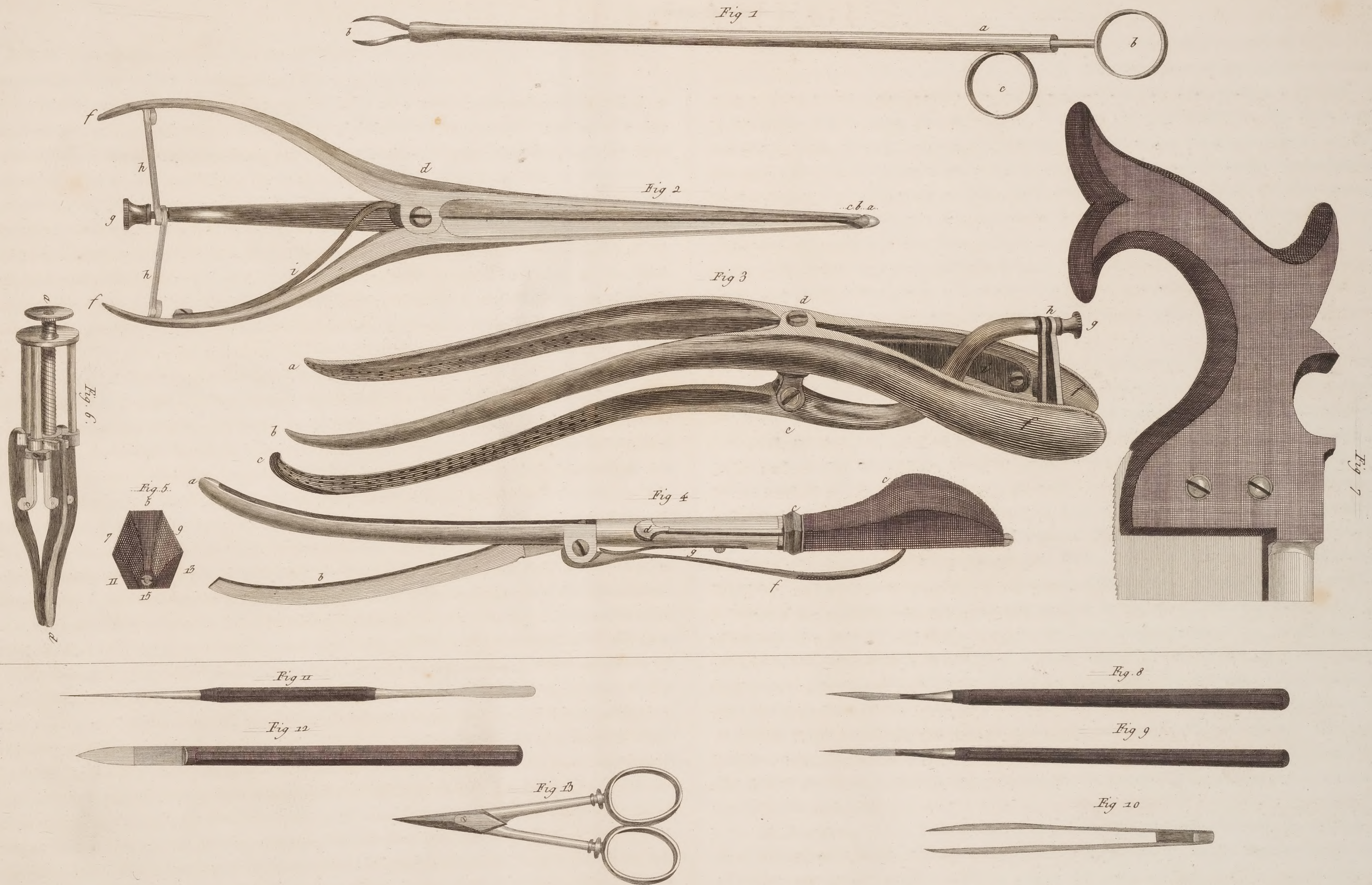
FIG. 8, 9. Two small, and very sharp Knives.

FIG. 10. A pair of Spring Nippers, with very fine points, made exactly upon the same principles as those for anatomical dissections.

FIG. 11. A sharp pointed Needle, and a very thin Spatula, for separating the petals, fitted to one handle.

FIG. 12. A double edge Knife, of the form of a common bleeding Lancet.

FIG. 13. A pair of fine pointed Scissors.



THIS Plate contains a complete set of Obstetric Instruments, with several late improvements by Thomas Pole, teacher of midwifery in London.

It will not be necessary, in the explanation of this Plate, to enter into the application and use of all the instruments delineated (as there is only one of them entirely new, viz. the Obstetric Bone Forceps), but to point out the circumstances in which they differ from those in general use, and the reasons for such alteration, which, I think, gives them the decided preference. In order to do this it will be almost endless to make a comparison of them with the variety now in use; I shall therefore only compare them with those most approved and in general use. In these drawings I have endeavoured to represent the several instruments in a way that shall not mislead the workman who may be employed in making them from the Plates only, and having been in the habit of drawing for this purpose, I presume I have made them upon such a principle as to fully answer that intention.

FIG. 1 represents the Forceps, which does not vary from Dr. Lowder's in respect to length excepting in the handles, which are four or five eighths of an inch longer; but the space between the blades from (a) to (b) is rather less than his: this was done from a consideration, that when the blades are too open they will not so well apply upon a small head, or one that has been much elongated by pressure, whereas a closer bladed pair will apply upon a larger head, which only requires them to be proportionably separated. The extremities of the blades approach much nearer than those of Lowder and other moderns; by this means they come more in contact with the chin, and prevent its slipping between the points, which may prove injurious to the child. The handles of the instrument materially differ from any others, and I conceive it to be a very material improvement. On the outer sides of the handles are four indentations (c), (d), (e), (f), to receive the four fingers when the instrument is grasped in the hand of the operator, which effectually prevents it from slipping, as every one who has used the common Forceps must have experienced, when lubricated with the uterine discharges; neither does it require that exertion of the hand to hold it, which is always extremely wearisome in difficult cases. Some practitioners, who from habit are attached to Lowder's blades, I am informed, have had them made with these handles, since I first invented them, from a full conviction of their superiority; and every accoucheur may have them made to suit the size of his own hand. The indentations should be more concave in the lower part from (g) to (h), than from (h) to (i), which forms a more favourable lodgment for the fingers when extracting. The circular groove round the lower part of the handles is continued, as in Doctor Lowder's and others, for those who are advocates for the handles being confined with a fillet, though, I confess, I am not. It must be acknowledged that these handles are more troublesome to be covered with leather than others, but it is a consideration immaterial when compared with the improvement; I have had them both covered and polished, the latter of which is delineated in the Plate.

FIG. 2 exhibits one blade of the Forceps in a reverse direction, and shews its true length, supposing it to be entirely straight. This is so represented on account of the workman, whom I have sometimes misled by fore-shortening the drawing upon a principle of perspective: Fig. 1. shews the curvatures, and this the true length of the blades and handles. This drawing exhibits the alterations made in the blades in respect to their breadth. Dr. Lowder's blades are broadest toward the joint, and gradually contracting as they advance toward the extremities: these are just the reverse, and for this obvious reason; the principal force of the instrument is applied at or near the extremities, consequently the more extensive the pressure is made, the less violence is inflicted on the parts upon which they press; and the breadth of the blades will also admit of their being made thinner, by which they will occupy less space: a circumstance desirable where the Forceps is required. Viewing the handle in this way it appears like those in common use, and needs no remark.

FIG. 3 represents the grooved Vectis. This instrument is made broader at, and toward the extremity, than those of Lowder and others, for the same reasons as were advanced respecting the Forceps, but which are more especially applicable in regard to this instrument. The grooves run transversely, and should be about the sixth or eighth of an inch distant from each other; the ridges between each groove and edges of the instrument should be rounded off and polished, to prevent their injuring the part when applied; these grooves should be made pretty deep at the extremity, and for three inches toward the handles; then may be shallower and shallower as they advance toward the handles, and so gradually lost at about four inches and a half from the extreme end of the blade: their use is to prevent the instrument sliding, which it does by gentle pressure continued for a short time when properly applied on the head. It may be supposed by some that the grooves are likely to injure the head, but experience has taught me the contrary; and, even if they should make a visible impression on the part, every one knows that would spontaneously disappear in half an hour after the delivery. The handle of the Vectis is made on the same principles as those of the Forceps, with indentations on that side where the fingers are applied, as may be seen in Fig. 9 and 11; the same handle being adapted to the three instruments, Vectis, Crotchet, and Blunt Hook, for the sake of portability, which is fixed occasionally by means of a screw confined by a spring catch in the usual way.

My ingenious friend, John Savigny, has invented a method of fixing the handles of these instruments, which I think a considerable improvement, as he thereby avoids the asperities about the handles liable to injure the maternal parts, as is represented in Fig. 13.

FIG. 4 is a delineation of the blade of the same Vectis, viewed edgewise to shew the degree of curvature, which is greater than those in common use; but by this it has a much more secure hold.

FIG. 5. The form of the Perforator. This instrument should be made stronger than is represented in the Plate, as I have several times experienced them to bend in making the laceration in the head, especially when obliged to make the opening behind the ear in preternatural presentations, when under the necessity of bringing down the feet and arms before the head can be perforated.

FIG. 6 gives a view of the point of the Perforator from a little below the shoulders, to shew the curvature which should be given to it, in order that the point may be directed perpendicularly on the part it is to perforate, which greatly facilitates its entrance: this is the more necessary, as the instrument must, in general, be introduced obliquely to the surface to be operated on, and thence, if straight, would be more liable to displace the head, or slide over the surface, and injure the rectum, &c.

FIG. 7 represents an instrument I have added, and to which I have given the name of Obstetric Bone Forceps. I was led to the invention of this instrument from experiencing considerable difficulty in perfectly detaching and extracting the bones of the cranium with the Crotchet, assisted by the fingers, which, when extended, have but little power to act for the want of the thumb being employed, which cannot be done without increasing the bulk of the hand to a very inconvenient degree, and cannot be used above the superior aperture in a pelvis so narrow as to require the removal of the bones: when they are partially detached from the scalp and dura mater, this instrument may be introduced along the palm of the left hand in a close state, then opened by means of the fore finger and thumb being placed in the bows, so as to get one of the bones flatwise between the blades, which gives a good and secure hold of it; thus it may be completely separated and extracted. Several years experience has convinced me that it is a very useful and necessary instrument; it is made in every respect like the Perforator from the bows to the joint, but should be stronger than is represented in the Plate, as the length of the handles is apt to give them too much spring, which renders their hold less secure. From the joint to the point should be about two inches and a quarter, and for near half its length supplied with transverse teeth on each side alternately indented between each other; below which, toward the joint, should be an open space, as represented in the Plate; this is to allow room for parts of the scalp, &c. which may get between, and would otherwise prevent the teeth closing upon the bone; the same reason also may be given for the stems of the handles receding in like manner from each other, and to allow for the spring which they will unavoidably have.

FIG. 8 shews the blades, or acting part of the Forceps, in a reverse direction, by which may be seen their breadth and rounded figure, in order that there may be no asperities to injure the parts of the mother.

FIG. 9 represents the Crotchet, differing but little from those in common use, and therefore a full explanation of this instrument is unnecessary. There is, however, a difference of opinion respecting the exact position of the point; some contend for its standing directly towards the handle, as represented by the point formed by the dotted line (a), to prevent injuring the parts of the mother; but, I think, it greatly frustrates its use, for we are to consider the instrument is to act principally on the concave surfaces of the bones of the cranium, and unless it stands more forward, as represented by the point (b), it is perpetually flipping, which renders the delivery extremely wearisome to the patient and

ourselves. It is true the instrument is a dangerous one in the hands of the timid or ignorant; but the judicious practitioner will always know how to guard against the injuries alluded to.

FIG. 10 represents the point and part of the stem of the Crotchet in front view, by which we see its breadth in different parts: at the angle from (a) to (b) five eighths of an inch, the point from (c) to (d) about five or six eighths from the angle, and is not made of an acute form, but rounded off. In this way it forms a sharp round edge, rather than a point; by this means it will fix on the surface of a bone without danger of piercing it, and injuring the maternal parts.

FIG. 11 is a delineation of the Blunt Hook, in the form of which there is a considerable variety. I think the great degree of curvature which many have given to this instrument, as shewn by the dotted line (a), is highly improper, as the point, though blunt, is capable of seriously injuring the child, and can answer no good end; the bend being such as to insure the instrument from flipping off the part it is to be applied upon, is all that is required, and the point (b) is sufficiently curved for that purpose. The stem of the instrument has always been made straight, but I have given to it an incurvation, in order that the middle of the hook, which is the acting part, may be brought in an exact line with the axis of the handle, described by the dotted line (c): this, I think, is more consistent with the mechanical principle upon which the instrument acts, and upon which it should be constructed.

FIG. 12. The Obstetric Scissors. This instrument was formerly made to answer the purpose of a Perforator also, which rendered it incomplete for either purpose; the shoulders, which projected from the outer edges of the blades, were altogether in the way when used as scissors, and being made quite straight, rendered it improper for use as a Perforator. It may be said this is a needless instrument: I acknowledge it is almost so; and although it may not be used, on an average, more than once in a man's life, yet I conceive it may be sometimes useful in the delivery of monsters, by the separation of parts which prevent delivery in their entire state; upon this consideration I think it proper not to reject it entirely, but to represent it in an improved form, such as, I believe, will best answer the intended purpose; and, as it is a kind of instrument familiar to every one, it requires no further explanation.

FIG. 13. A section of a handle for receiving various single instruments used in midwifery, explaining an improved mode of connecting them with it, by which all the asperities hitherto attending their junction are avoided, and the handle and blade become at this part as if one solid instrument. The handle is perforated throughout, its inferior extremity adapted to the square end of the instrument, Fig. 14, which, on being inserted into it, is received by the screw, and by it drawn towards the handle till they unite in close contact, the external substance of both exactly corresponding and forming one smooth and level surface; the bright dot near the superior extremity of the handle denotes a rivet passing through it, engaging in a groove near the head of the screw, by which it is prevented from flipping out of its situation; the head of the screw projects slightly beyond the circumference of the handle, and its edges being milled, afford ample command to the fingers in turning it, and at the same time form an elegant finish to this part of the instrument.



P L A T E X X X V I I I .
M I S C E L L A N E O U S .

FIG. 1 represents an instrument lately invented for opening large tumours at opposite extremities, and for occasionally passing a seton through the same. It is formed of various lengths, from eight to twelve inches, and consists of a flattened canula, or sheath, of steel, open on its concave edge from the part near the handle, which receives the screw, to within two inches of its point, and containing a lancet, which is easily exposed or concealed by the action of the thumb upon the projecting piece above the screw. It is here shewn with the lancet concealed, being drawn back after being supposed to have introduced the instrument into the superior part of the tumour; in this state it is carried forward to prevent internal injury, till it arrives at the opposite and inferior extremity, when it is again advanced to open a passage through the skin, when, should it be deemed expedient, a seton is passed through the eye at the end of the canula, and is drawn with it through the tumour. (a) The lancet detached from the Canula or Conductor, the chafin near the point giving it a degree of elasticity accommodating to the curve of the sheath, and the groove at its other extremity sliding upon the screw which connects and secures them together; (b) the curved extremity of the instrument, with the point of the lancet (c) protruded.

FIG. 2. The Double Staff of Mr. Earle. As the properties of this much esteemed and ingenious invention have been most ably described in a treatise by the inventor, I shall only presume to explain the representation of its component parts, referring for more ample information to the intelligent publication alluded to. I have here shewn it completely connected, and below have given a delineation of its parts detached from each other: (a) the short or upper staff, (b) the handle of the long or lower one, with the joint upon its superior surface by which they are united; (c) a piece of steel, forming the segment of an arch, and fixed vertically upon the inferior portion of the handle of the long staff, which, fitted to pass through an opening in the short staff, and retained in this position by the spring with which the latter is furnished, keeps it perfectly steady, and prevents the possibility of the point's deviating on either side of the groove, so that, when shut down, it is certain of passing into the cavity formed for its reception; (d) a section of the short staff to shew the opening and spring, which receive and secure the vertical piece of the long one, and thus connects them firmly together; (e) a pin to fix or disengage the joint at pleasure.

FIG. 3. A case for carrying and preserving variolous matter. It is composed entirely of silver, and is constructed to shut so close as to exclude air, so that the matter may be kept a considerable time: (a) the case, having in the interior part of its bottom, or back, a small spring, which, acting upon the inferior edge of the blade (b), throws it open on pulling back the button (c); (b) a thin blade of silver, attached not to the centre of the back, but its plane forming an angle with one of its edges; thus, when shut, allowing sufficient space to prevent the matter from being rubbed off by the side of the case; the notch in its superior extremity engages with the small spring connected with the button (c), and is by it kept closely shut within the case.

FIG. 4. A machine termed a Nipple Cover, which, when furnished with its appendage, the teat of a heifer, prepared agreeably to the subjoined instructions,* I may safely pronounce one of the happiest of modern inventions, as, by its assistance, the greatest and most natural satisfaction which a woman can enjoy, that of suckling her infant, may be obtained in cases the most painful, and often hopeless. It is formed of silver, of the size here represented, the sketched section adjoining explaining the figure and dimensions of the projection in its centre, intended to cover the nipple. It is furnished with a number of small holes at its extremity, through which, and the medium of the teat, the infant's exertions draw the milk, and assist the formation of the nipple without the excruciating pain which mothers too often suffer from their natural perseverance in these pleasing attempts.

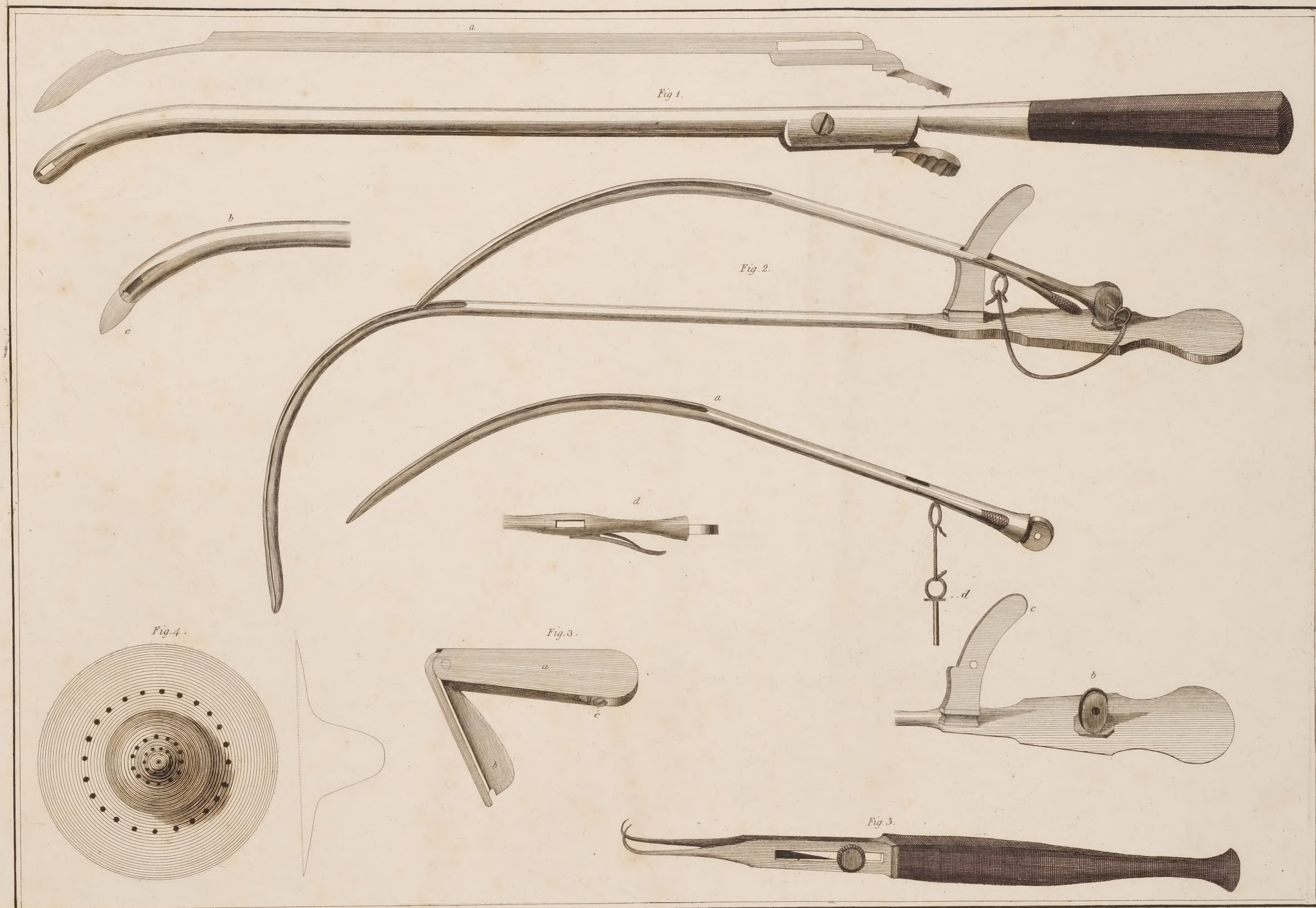
FIG. 5. A late improvement upon the Dissecting Hook, which, by means of a groove and sliding button, unites to a single one, the advantages of double points admitting variety of dimensions.

* Having procured a heifer's teat, turn it inside out, cleanse it well from the fat and mucus; reverse it and throw it into some *pure* and *strong* spirit, let it remain three or four days; take it out, and soak it a short time in cold water, to extract the unpleasant effects of the spirit; it must then be drawn over the silver case, and fixed to it by sewing through the holes at its base. Care must be taken that it is not left too long at the extremity, as, from its property of extension, the infant's exertions would draw it into its throat.

Previous to its being used it must be thrown into warm water to acquire a natural warmth, and when done with must be returned into cold water.

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PLATE XXXVIII.



Le Cœur del.

Hory sculp.

I N D E X.

PLATE

- I. Amputating Instruments.
- II. Tourniquets.
- III. Trepanning Instruments.
- IV. Lithotomy. Gorgets, Forceps, Scalpels.
- V. Lithotomy continued. Catheters, Staffs, &c.
- VI. Lithotomy concluded. Blicke's Gorget and Staff. Cooper's Gorget; improved Beak explained.
- VII. Cupping Instruments.
- VIII. Pocket Instruments.
- IX. Dissecting Instruments.
- X. Midwifery. Denman's, Lowder's, and Osborne's Forceps.
- XI. Midwifery continued. Vectes. Denman's Crotchet, and Blunt Hook.
- XII. Midwifery continued. Leake's Forceps. Clarke's Crotchet and Blunt Hook. Cruikshank's Tire Tete, Umbilical Scissors.
- XIII. Midwifery concluded. Leake's Spring Crotchet. Portable Set of Instruments.
- XIV. Teeth Extractors, various.
- XV. Teeth continued. Gum Lancets, Paces, Scalars.
- XVI. Eyes. Extracting and depressing the Cataract, Specula, &c.
- XVI. Supplement. Eyes. Fistula Lachrymalis.
- XVII. Apparatus for injecting Anatomical Preparations.
- XVIII. Elastic Bottles, various. Improved Glass for Drawing Nipples.
- XIX. Machine with Bellows for Tobacco Fumigations. Apparatus for Inflating the Lungs.
- XX. Kite's Portable Apparatus for Restoring Suspended Animation.
- XXI. Portable Set of Amputating and Trepanning, Bullet Forceps.
- XXII. Lancets, Crooked Needles, Seton Needles, &c.

PLATE

- XXIII. Instruments for Extraction of Polypi. Tonfil Scissors, Pharyngotomy.
- XXIV. Trocars. Earle's Apparatus for Hydrocele.
- XXV. Pins, Bandage, Scissors, Forceps, for Hare Lip. Richter's Knife for Bubonocoele; improved ditto for Fistula in Ano.
- XXVI. Splints for Legs.
- XXVII. Splints for Thighs.
- XXVIII. Speculum Oris. Knife for dividing Temporal Artery. Butter's Compress for ditto. Bell's Knife for Phymosis; improved Spring ditto for ditto. Forceps with double points. Gula Forceps. Ear Forceps. Needles for Aneurisms. Jugum Penis. Substitute for Decayed Uvula.
- XXIX. Trusses, inguinal, umbilical.
- XXX. Instruments for removing a portion of the Tibia.
- XXXI. Pullies for Dislocations.
- XXXII. Improved Ambé, with a screw.
- XXXIII. Pessaries.
- XXXIV. Machine for Dry Fumigations. Inhaler.
- XXXV. Improved Fracture Machine.
- XXXVI. Instruments for extracting Stones, &c. from the Urethra. Instrument of M. Herbiniaux for ditto from the Female Bladder. Frere Com's Gorget. Dilater for Prepuce. New handle for Amputating Saw. Collection of instruments for Botanical Dissections.
- XXXVII. Midwifery instruments by T. Pole. Improved method of connecting a handle to various single instruments.
- XXXVIII. Earle's Double Staff. New instruments for opening large Tumours. Case for Inoculating Matter. New Case for Nipples. New Double Dissecting Hook.

